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Welding Aluminum Automobile Bodies

Savings in Labor and Material Effected by the Oxy-Acetylene Process—A Special Flux Applied Wet with a Brush

BY C. R. SUTTON

IN the palmy days of the horse-drawn vehicle, Amesbury, Mass., was the mecca for the carriage industry. With the advent of the automobile what was more natural than the development of an industry more in keeping with the trend of the times? The carriage industry in the Amesbury of to-day is to a large extent replaced by factories devoted to the manufacture of automobile bodies, their products outrivaling in fitness of appointments and fineness of finish and design the most luxurious wooden coaches of old.

In Amesbury some rather remarkable methods of aluminum body construction have been developed which have made possible radical departures in design, savings of material through the more economical cutting of patterns and savings in actual labor costs as well. Oxy-acetylene welding plays an important part in this new type of body construction at the plant of the Walker-Wells Company, a development of the Walker Carriage Company, manufacturer of carriages for more than 25 years.

In the manufacture of the Franklin roadster body the back quarter panels, consisting of a single piece of sheet aluminum extending from the door opening on one side around both quarters and across the back could be constructed in no other way except by welding. The entire section, welded into one solid piece without a seam in 4 min., is shown in Fig. 4. The unpainted Winton Berlin body is another example of the saving effected by oxy-acetylene welding. The top of this body is constructed of aluminum, and is welded to the back panel to form one continuous piece. The top, as well as the various other parts, may be made up from several plates welded together, which obviates the necessity of using large sheets of aluminum, thereby reducing the cost, and in some cases permitting the use of various small pieces of sheet aluminum that would otherwise be-

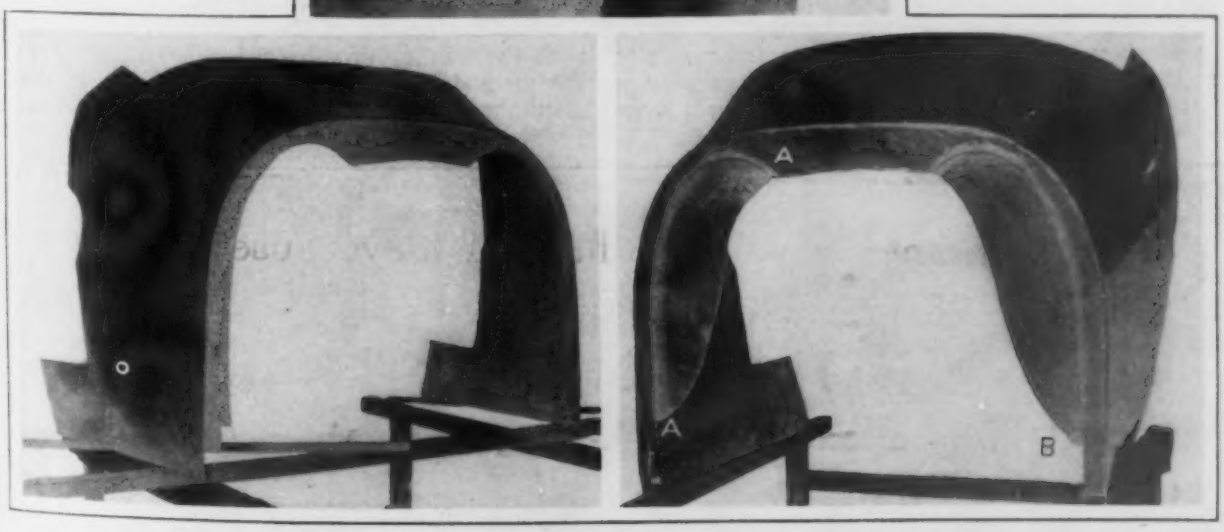


Fig. 1—The Cowl Hammered to Shape with Very Little Metal Formed over the Front

Fig. 2—Welding in Front Panels of Cowl and Method of Holding Sheets

Fig. 3—The Cowl with Front Panels Welded in Place at A and B in 7 Min.

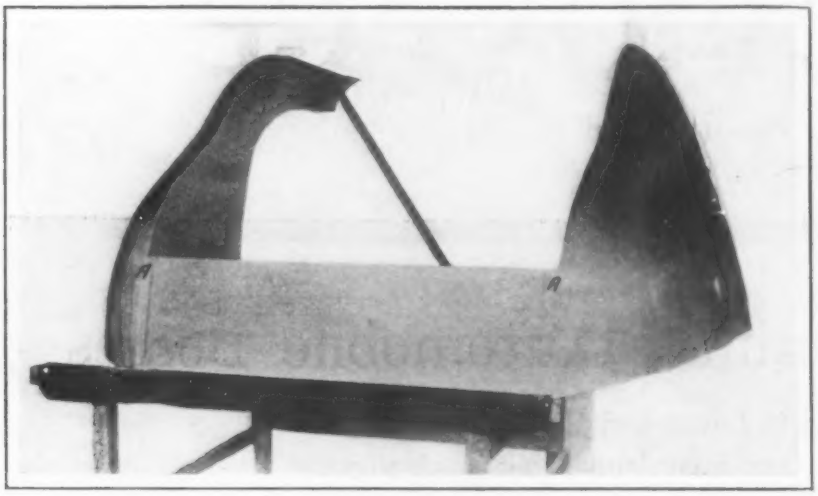


Fig. 4—Back Quarter Panels of a Franklin Roadster Extending from the Door Opening on One Side Around Both Quarters and Across the Back, Which Was Welded Into One Piece at A in 4 Min.

Fig. 5—A Center Post Panel Welded at A from Odd Stock in 5 Min.

come scrap, again effecting a considerable saving. The construction of a center post panel from four pieces of stock of odd sizes is shown in Fig. 5. Welding time on this type of panel construction is 5 min.

The forming of the cowl on the Franklin bodies formerly presented many difficulties, due to the large amount of metal that must be formed and swaged over the front to form the front panel. This difficulty has been overcome by the welding process, as shown in Figs. 1, 2, and 3. Fig. 1 illustrates the cowl hammered to shape with very little metal formed over the front. The remainder of the front panel is made up by welding in small side sections or wings, as shown in Fig. 2. Fig. 3 shows the completed part, the front panel sections now conforming with the characteristic lines of the Franklin hood. The total length of this weld is approximately 60 in. and the total welding time for both sides is 7 min.

A view of the Franklin roadster rear boot, welded into one solid piece, is given in Fig. 6. The total time for these two welds is 7 min. The same class of work on a coupé rear boot requires a much shorter time, only 5 min., for welding. Welding of this character is carried out with the separate parts clamped on a frame, as shown in Fig. 7.

Another operation which formerly presented difficulties in automobile body manufacture is the forming of door panels around the window frame openings. This was formerly handled by slowly hammering the metal over the frame and carefully working in the corners, the process occupying a total time of over 2½ and sometimes 3 hr. Even by proceeding slowly and exercising the greatest care in the forming of the metal at the corners, it was found that cracks would appear at various places in the metal, due to the strain of working the metal cold. A considerable loss of material was the result in a great many instances. This difficulty is now overcome by using a small acetylene blowtorch, which is similar in principle to the well-known Bunsen burner. The metal is simultaneously annealed and hammered by one man, as shown in Fig. 9. In this case the same cylinder of acetylene that is ordinarily used with the oxy-acetylene outfit is now employed to furnish gas for the annealing and hammering operation. The total time occupied by this newer method is 30 min., at a time cost of less than one-fifth of what the old method of hammering cold formerly cost, and with practically no loss.

A striking example of the savings that are being made in the laying out of patterns on aluminum sheets is given in Fig. 8. The illustration is of a Sedan cowl, roughly shaped, with small pieces welded to the corners, a considerable saving in the size of the sheet necessary for this pattern. The total time consumed in welding the two corners *A* and *B* was 5 min. Various other parts not illustrated are welded in this interesting industry, and the oxy-acetylene process also finds many other important uses on general welding work about the plant.

For the benefit of those who are not familiar with the welding process, a detailed explanation of the method of proceeding with this class of sheet aluminum welding will doubtless prove interesting

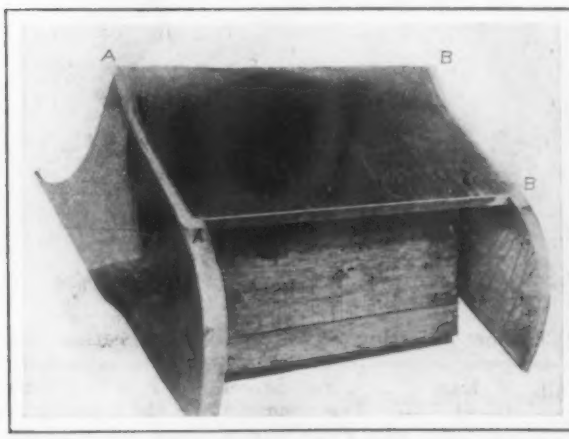


Fig. 6—Rear Boot of Franklin Roadster Welded at A and B in 7 Min.

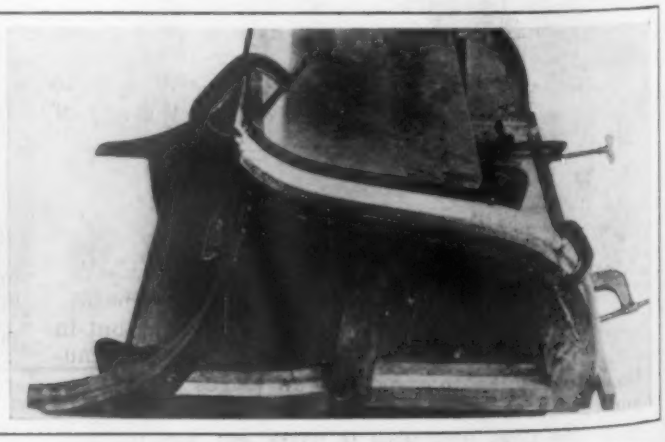


Fig. 7—Aluminum Sheets of Roadster Rear Boot Clamped in Position for Welding

and instructive. In the majority of operations the edges of the sheets to be welded are turned at right angles to a height of from one-and-one-half to twice the thickness of the metal. After applying a flux to cause the metal to flow freely, these upturned edges are brought together and held with clamp tongs, such as are being used by the operator in Fig. 2. A short section of a few inches is then welded. This welded section is allowed to cool thoroughly before removing the clamp, otherwise a crack would develop which might follow the subsequent welding, as aluminum, when subjected to intense heat, is very fragile. The tongs are then moved a few inches along the line of the weld and the metal welded to that point. This is continued until the entire section has been joined. The part not yet welded is allowed too hang free, or is held by a helper, according to the size and shape of the sheets. Often the helper assists the welder by manipulating the free ends of the unwelded portion by bringing them into their true relative positions as the clamp is moved along the line of the weld in advance of the welding operator. Preliminary tacking of the joint at regular intervals with the welding flame, except at the point where the weld is begun, is not considered good practice, as it has a tendency to cause a buckling of the sheets as the weld progresses, which interferes with the progress of the operator and nearly always results in bad workmanship.

The proper use of a fluxing agent is one of the most important points to be watched in sheet aluminum welding. Its improper application nearly

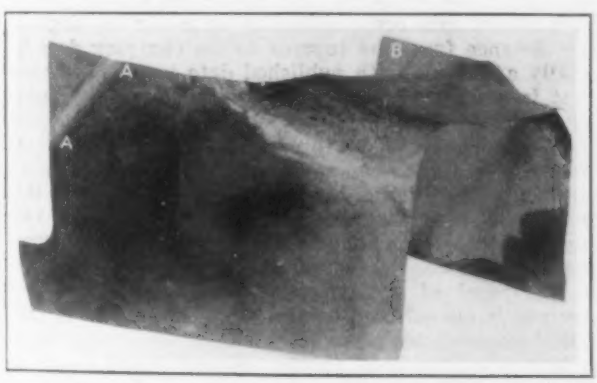


Fig. 8—Small Pieces Welded to Corners of Cowl at A and B in 5 Min., and Effecting Considerable Saving in Material

always results in imperfect work. The following information will prove useful to welders engaged on sheet aluminum work. A special sheet aluminum flux, mixed with water to the consistency of cream, is applied to the line of the weld by a stiff brush similar to a painter's sash tool. After the weld has been completed the flux is washed off either with a scrubbing brush or, as is more commonly the case, with a bunch of waste soaked in cold water, the water being applied freely. It is necessary to remove all of the remaining flux from the line of the weld and the adjacent metal for the reason that practically all aluminum fluxes contain chlorides, and aluminum is very susceptible to the action of chlorine, either in the free state or in combination with other elements. This causes corrosion, which may or may not appear until after the body has been painted, when it will cause the paint to peel.

Not all fluxes can be used in a wet form, but in the event that a dry flux is used the same precautions in regard to removing all traces of the flux apply. It is customary to have a pail of water handy so that the scrubbing may be done immediately upon the completion of the weld. Care should be exercised not to "trap" the flux in the weld, in

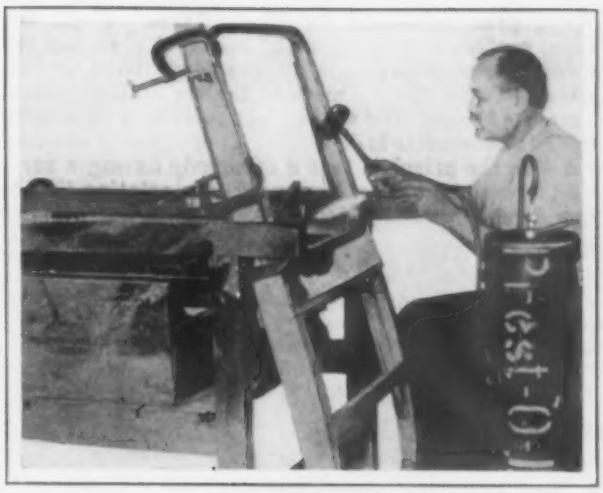


Fig. 9—Annealing Aluminum Window Frame Opening with Acetylene Blow Torch to Facilitate Hammering over Frame Without Cracking

which case no amount of scrubbing would remove it. By "trapping in the weld" is meant the flowing together of the metal in the joint above and below the flux so that the flux cannot be entirely burned out.

An advantage in using flux in a moist condition is that when applying the first coat with a piece of cloth both edges of the metal must be rubbed to a distance of about ⅜ in., which effectually removes any oxide from the surface of the metal and also destroys any greasy material that might form a film over the molten metal. After this is done a second coat should be applied sparingly with the stiff brush.

No filling material is used in the welding operation, except at such points as a defect may occur, either through the improper handling of the welding flame or lack of a sufficient quantity of flux to allow the metal to flow together freely. In the latter case, usually a narrow strip cut from the same metal is used as a filler, and the operator re-fluxes the line of weld before starting to fill in the defective spot.

After welding, the line of weld is hammered flat under spring power hammers, similar to those used for flat hammer work in all sheet metal industries.

The Baby welding blowpipe used in this class of welding is a new product of the Presto-O-Lite Company, Inc., Indianapolis, Ind. It is peculiarly adapted to sheet aluminum welding on account of its small size and its easy manipulation. With it a workman can weld thin sheets more rapidly than with the heavier type of blowpipe such as is commonly used in large repair work.

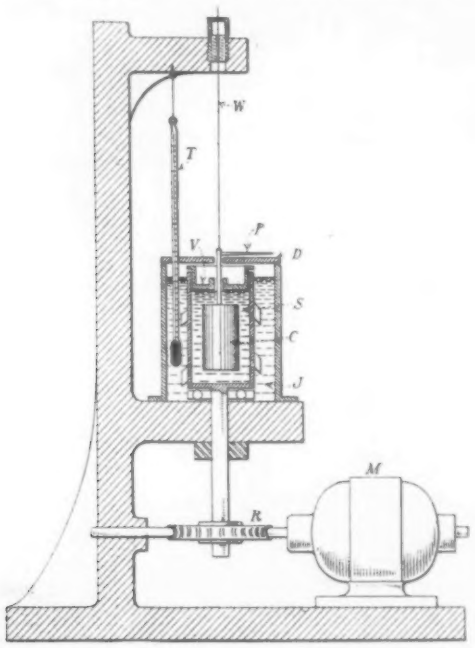
British Pig Iron Output in 1915

Great Britain's pig-iron output in 1915, according to the data published by the Iron, Steel and Allied Trades Federation Statistical Bureau, was 8,793,659 gross tons; 53,000 tons of this is estimated. The total was made up of 1,024,063 tons of forge, 1,573,575 tons of foundry, 2,272,684 tons of basic and 3,564,276 tons of hematite iron, 255,484 tons of spiegeleisen, ferromanganese and ferrosilicon and 103,577 tons of direct castings. Out of a total of 489 furnaces, 291 were in blast.

The next meeting of the New York Section of the Society of Chemical Industry will be held at Rumford Hall, 50 East Forty-first Street, on Friday evening, April 21, at 8.15. The program for the evening will include a paper on "The Present Status of the American By-Product Coke-Oven Industry," by Thomas C. Clarke.

A New Form of Viscosimeter

In a paper presented by H. C. Hayes and G. W. Lewis, professor of physics and assistant professor of engineering at Swarthmore College respectively, at the spring meeting of the American Society of Mechanical Engineers held at New Orleans, La., April 11-14, a new form of viscosimeter is described. It operates in accordance with the principle that a solid body having a surface of revolution when suspended in a rotating liquid experiences a torque which is proportional to the viscosity of the liquid under test, such as a lubricating oil.



The Viscosity of an Oil is Here Measured by the Twist Given to a Body When Oil Chamber Is Revolved

The specimen S is contained within a cylindrical chamber that is rotated uniformly by a motor, M, through a worm drive, R. A cylinder, C, is suspended within the specimen by a thin steel wire, W, so that the axes of the rotating liquid and the cylinder coincide. A cap, V, shaped so that the excess liquid can overflow when the cap is seated and thus give constant conditions within the specimen chamber, is provided. The specimen chamber is surrounded by an oil jacket, J, in which a thermometer, T, is suspended. The jacket oil may be brought to any desired temperature by a heating coil. The cover of the jacket chamber D has a scale graduated in degrees or may be calibrated to read the viscosity in terms of a standard liquid directly through the deflection of the pointer P. The specimen chamber and the suspended cylinder are both made of copper to insure a constant temperature throughout the specimen and the outside of the specimen chamber is provided with blades which keep the jacket oil thoroughly mixed as the chamber revolves and thus expose the latter to a uniform temperature. This, it is explained, is an important factor toward insuring constant temperature throughout the specimen.

Experimental work conducted with the machine has shown that the temperature of the specimen is uniform to within a small fraction of a degree and follows that of the jacket oil so closely that the temperature-viscosity curve can be taken while the temperature is slowly raised or lowered. This has proved to be a great saving of time and also saves labor, as it is not necessary for the operator to stand by the instrument continually. The deflection of the pointer is at any instant a measure of the viscosity, so that all that is required is to take simultaneous readings of temperature and deflection at intervals in the heating or cooling process.

The Steiner Mfg. Company, gasoline engines, Plymouth, Wis., has been obliged to place an overtime working schedule in effect to enable it to fill orders. Further orders from the Pacific coast have made this necessary.

New Centrifugal Pump Duty Record

A duty record of 168,300,000 ft.-lb. per 1000 lb. of steam has been established by the centrifugal pump installed in the Low-Level Pumping Station of Montreal, Canada. The pump is driven by a steam turbine built by the DeLaval Steam Turbine Company, Trenton, N. J., and has a capacity of 30,000,000 imperial gal., or 36,000,000 U. S. gal. per 24 hr. against a 210-ft. head. The test consisted of an 8-hr. continuous run after the pump had been operated steadily for 15 days of 24 hr. each. The specifications covering the pump required that the duty guaranteed should include all losses, including pipe friction, velocity head and steam used by the auxiliaries, with the further stipulation that the pumping unit should be credited with the vertical distance from the water in the suction well to the center of the pump shaft, while the discharge pressure should be measured at the point of connection with the city main corrected to the elevation of the center of the pump shaft.

The specifications of the turbine and pump, which were supplied by the E. Laurie Company, Montreal, representative of the DeLaval Steam Turbine Company, are given in the accompanying table:

Rating of turbine, b.hp.	1,600
Number of stages	14
Speed of turbine, r.p.m.	2,600
Ratio of gear reduction	6 to 1
Speed of pump, r.p.m.	600
Diameter of suction and discharge openings, in.	36
Weight, including pump, turbine and reduction gears, lb.	80,000
Floor space required, sq. ft.	247

Coke Consumption and Height of Cupola

Coke consumption in the cupola is discussed by M. E. Gallon in the March issue of the *Foundry Trade Journal* (British). He considers that the height of the cupola stack affects coke consumption to an important degree. The distance from the tuyeres to the charging door is usually arbitrary, with published data based rather on what is accepted as fairly good practice than on any law. This particular factor is generally obscured by such variables as blast pressure and density of the charge. Mr. Gallon contends that the higher the stack, within practical limits, the greater the efficiency of the furnace. It is not known whether this is because of the longer contact of the hot gases with the iron, longer contact with the coke or by creating increased resistance to the travel of the gases. The amount of oxygen blown in is not affected by the height of the stack, and if that oxygen combines with carbon in the melting zone to form CO_2, the only further change it can make is $CO_2 + C = 2CO$, resulting in waste of fuel without further heating. But if a proportion of the oxygen is already passing off as CO, because of imperfect combustion, no increase in height will alter the fact, though it would abstract a little more heat from those gases the same as with CO_2 or any other hot gas.

To Sell Electric Steel Ingots

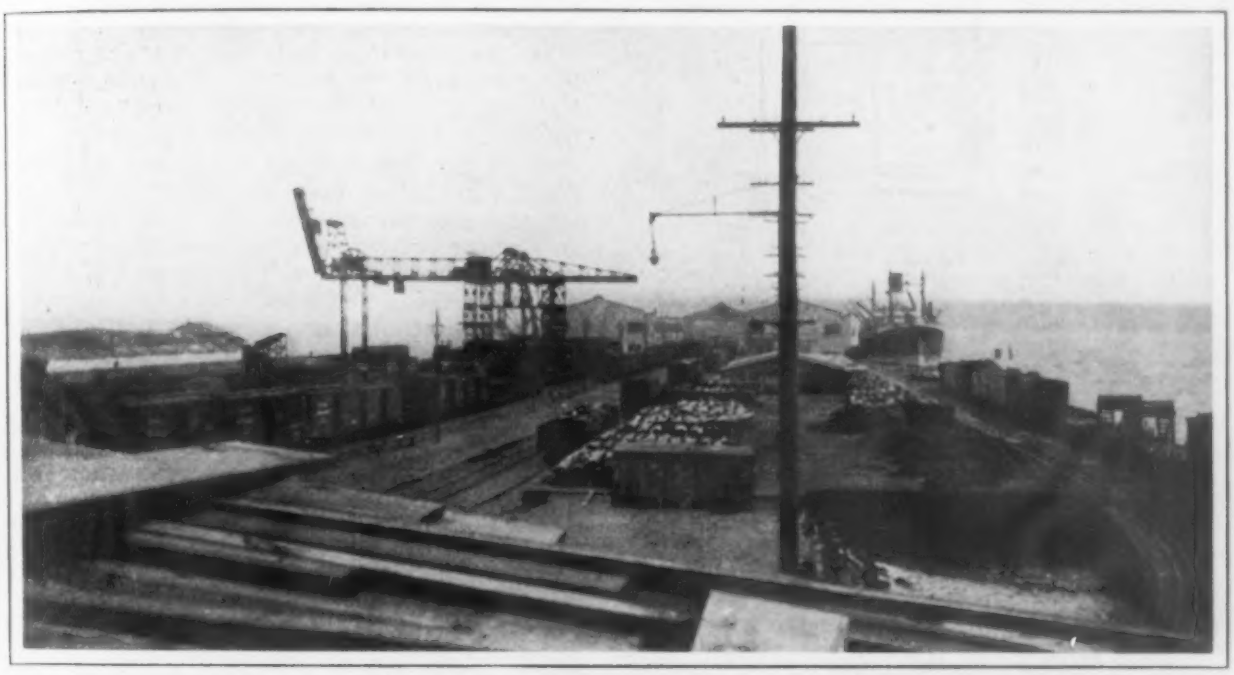
The Charleston Steel Company, Charleston, W. Va., has been incorporated to manufacture steel ingots of plain carbon and alloy steel in electric furnaces. The authorized capital is $400,000. H. G. Scott, president Virginia Power Company is president; Isadore Schwabe, treasurer, and Edwin M. Burdette, secretary, all of Charleston, and J. G. H. Hamilton of Hamilton & Hansell, New York, is vice-president. Contracts for the buildings have been let to the American Bridge Company at a cost of $150,000 and two 8-ton Rennerfelt electric furnaces have been ordered. The other equipment will be mainly second hand, new machinery not being obtainable. Scrap metal will be the raw material and natural gas and electricity will be largely employed. The electric power will be furnished by the Virginia Power Company.

The Reading Car Wheel Company, Reading, Pa., will supply 8000 wheels for 1000 gondola cars recently ordered by the Philadelphia & Reading Railroad.

HEAVY SHIPMENTS AT SEATTLE

One of the Most Valuable Pacific Coast Cargoes in Years

SEATTLE, WASH., April 6, 1916.—One of the finest terminals for the meeting of water and rail traffic on the Pacific coast is the Smith terminal of the Seattle Port Commission. Every means is provided for the handling of cargo with dispatch, from the ship to the cars and vice versa. There are three cranes on the left leg of the U-shaped dock. The traveling gantry in the foreground of the accompanying view traverses the dock from one end to the storage shed on the other end. It has a capacity of 5 to 10 tons and is used for unloading cars on the dock for storage, loading ship with outrigger over the hold, for coaling ship, etc. The stiff leg with a wood boom 100 ft. long and 16 in. square handles ship's cargo when the gantry is otherwise occupied, and can handle a load of 10 tons from the dock to the hold and place it anywhere within the square of the hatch. There is also a shear leg crane of fabricated steel built in Seattle which has a capacity of 100 tons. It is used for lifts of 10 tons or over.



A Seattle Port Commission Dock on Which a Record Pacific Coast Cargo Was Recently Unloaded

Stored on the left dock at the time the photograph was taken and awaiting shipment to Russia via Vladivostok were 160 knock-down box cars for the Siberian Railway, 150 cases of shell-making machinery for the arsenal at Petrograd, 10 cars of barb wire, and the white line to the left of the photograph is a train of flat cars with 36 armored autos which the boats take for deck loads. In the shed there were 35 cars of zinc, 5000 kegs of railroad spikes, 20 cars of barb wire and 1000 bales of cotton. On the right leg in the foreground were 5000 tons of bar steel for Yokohama, 900 tons of sulphur for Tacoma, 15,000 kegs of dog-eared railroad spikes for the Russian Government, 900 bales of cotton, and 10,000 kegs of wire nails for far eastern ports. In the shed there was stored a large portion of the cargo of the steamer Talthybius of the Blue Funnel line, to the right of photograph, and the incoming cargo was valued at $8,500,000. It consisted of 14,000 measurement tons, mostly raw rubber in 18,000 cases and valued at $5,000,000, consigned to Akron, Ohio. It was the largest shipment of raw rubber ever brought across the Pacific from the Straits Settlements. Other shipments of Chinese and Japanese general merchandise and of block tin from Banca were valued at $2,500,000, and a partial cargo of raw silk valued at a million finished the most valuable general cargo that has arrived on the Pacific coast in years.

The Talthybius took a full cargo on her return trip, all American made goods. It consisted of flour, iron and steel, machinery, automobiles, wire nails, steel plates, wire and cotton. Every one of the holds was full to the brim, and all was loaded over this dock, but even with all this prosperity and the further fact that the four other docks of the Port Commission are overflowing with freight from and for the far east, political influence and private interests have tried to make the general public believe that these docks are a failure. It can be truthfully said that not another dock on the Pacific coast is as well equipped for the handling of shipments large or small; and there are but few on the Atlantic coast that can dock seven ships of the size of the one shown. The only reason there are not more ships docked here now is that they are not available and the cars to handle the incoming cargo are not to be had.

French Iron and Steel Imports in 1915

French pig-iron imports in 1915, according to *L'Usine*, exceeded all previous records, being 175,201 metric tons, mostly from Great Britain, against 21,900 tons in 1914 and 50,345 tons in 1913. Imports of semi-finished and manufactured iron and steel in 1915 were 902,585 tons against 109,459 tons in 1914 and 152,000 tons in 1913. It is expected that the 1915 figures will be largely exceeded in 1916 because of the exhaustion of French stocks. The imports of machine tools and other products of iron and steel in 1915 expanded also, reaching 134,700 tons, twice those of 1914. Exports were greatly reduced, only 152,000 tons of pig iron and steel being sent abroad against 7,620,000 tons in 1913.

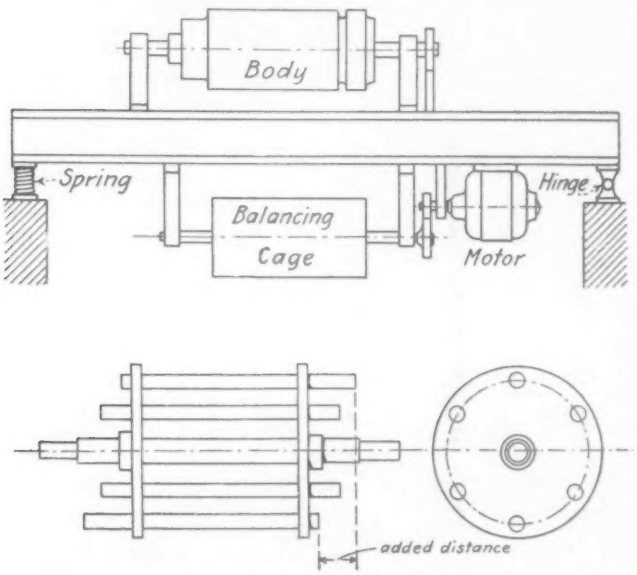
The Hilles & Jones Company, manufacturer of punching and shearing machinery, Wilmington, Del., has purchased the old iron rolling mills adjoining its property, originally operated by Seidel & Hastings and later by the Keystone Steel Company. The old buildings are now being razed to provide space for future development of the Hilles & Jones business. The approximate dimensions of the site thus acquired are 352 x 514 ft.

The Standard Chain Company announces that it will reopen its plant at St. Marys, Ohio, as soon as the necessary raw material can be delivered there. It has been shut down for some time.

DYNAMIC BALANCING MACHINE

How Unbalance of Machinery at High Rotating Speeds May Be Corrected

An ingenious machine, to give parts of machinery which have to revolve at relatively high speed such a degree of balance that there will not be vibrations in running, as in the case of automobile crankshafts or ventilating fans, has been designed by N. W. Akimoff of the Dynamic Balancing Machine Company, Harrison Building, Philadelphia. He regards it as employing a new principle, and he



Vibrations are Limited to a Vertical Movement and the Cage Below Is Adjusted to Neutralize Them

presented a paper descriptive of it before the meeting last week in New Orleans of the American Society of Mechanical Engineers.

He differentiates between static balance and dynamic balance. In other words, he calls attention to the fact that an unbalanced condition of a rotating body may be due either to lack of static balance or lack of dynamic balance. The static balance may be obtained by a static balancing machine which involves the drilling of one hole or the adding of a weight to bring the center of the mass of the body somewhere on the axis of rotation. In a statically balanced body, however, there may be two masses on opposite sides of the shaft, located axially some distance from each other. Such masses, owing to the fact that there is static balance, must be in the same axial plane and the products of each mass and its respective distance from the axis of rotation must be equal. However, the two masses on rotation form a couple with the result that when high speed is developed the vibrations manifest themselves, as is noted in the defective commutation in electrical machinery, with wear on bearings, or, in the case of grinding disks, defective products.

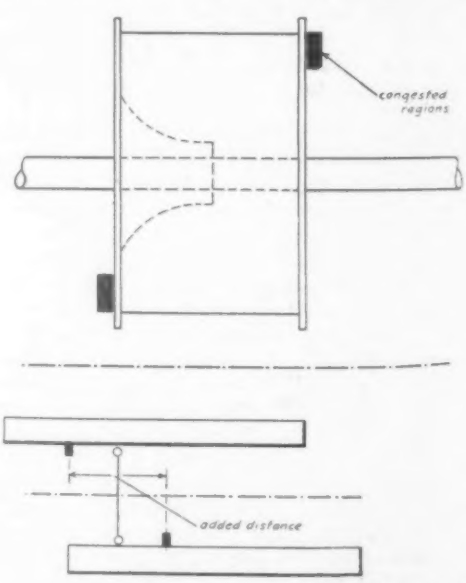
The object of the Akimoff machine is to establish another couple which shall still maintain the static balance, but also oppose the couple which gives unbalance at high rotative speed. The principle of the machine may be gained from the accompanying drawings.

A rigid horizontal beam, such as a lathe bed, is hinged at one end and supported by a spring at the other. The body to be tested, already in perfect static balance, is rotatably supported on the beam. If dynamically unbalanced, the body will, when rotated, cause the beam to vibrate in a vertical plane, with a period of oscillation equal to the period of rotation of the body. In other words, if the speed of the unbalanced body is, say, 315 r.p.m., the beam will vibrate at the rate of 315 complete oscillations per minute, quite regardless of the characteristics of the spring (except possibly at the very beginning of motion).

"Now imagine a second body," says the author, "exactly similar in every respect to the first, also in perfect static balance but dynamically unbalanced to precisely the same extent as the first body, temporarily associated with the same beam, say suspended under it. If these two bodies are oppositely located as to balance and run precisely at the same speed (synchronously), then the unbalancing or disturbing couples will cancel out, and the beam will have no tendency to vibrate, no matter how badly unbalanced, individually, are the two bodies. This is the fundamental principle of the machine—to determine unbalance by determining the unbalance necessary to neutralize its effect."

In the actual machine instead of the second body being an exact image of the original unbalanced body, it is a so-called squirrel cage, and this is rotated in unison with the article to be tested. The cage, as indicated, consists of two or more circular disks, carrying an even number of rods (usually six or eight) arranged slidably in the disks. The rods are accurately made and their common weight is known; therefore, any displacement of one of the rods with respect to the one exactly opposite will not affect the static balance, originally perfect, of the cage, but will introduce a certain centrifugal couple, according to the relative displacement or added distance.

As an example of the use of the machine, the author considers the case of a ventilating fan, shown in one of the drawings. The unbalance may be due to two excess weights grossly exaggerated in the figure. This will result in a centrifugal couple, and to counteract it the cage will have to be put into a state of unbalance as shown by the relative displacement of the rods and as measured by the added distance. Thus the cage has means for indicating the exact amount of the unbalance which has been put into it in order to reproduce with the opposite sign the exact unbalance of the article being tested. For instance, the displacement or added distance of 15/16 in. may represent for a cer-

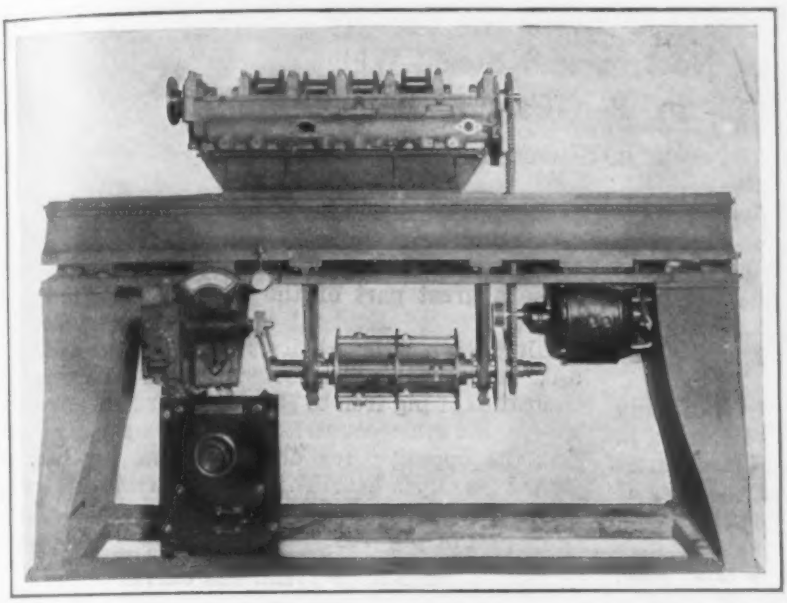


The Scheme for Neutralizing and Measuring Unbalance Illustrated in Case of Fan Wheel

tain speed a couple of 120 oz.-in. The plane of unbalance is established by the location of the two rods, the moving of which into a new position stops

the vibration. The value of the couple is immediately given by the added distance.

The object of the spring on the machine is to intensify the amplitude of the vibrations. An interesting feature is that the rods of the cage may be adjusted axially while the cage is in rotation. A set of tables is provided with the machine so that the operator can pick out the necessary directions as how to remove a certain amount of metal from one of the cranks of the automobile engine, for example, and how to drill the flange in order to secure the balance. The author admits that one pair of rods would suffice if the relative position of the rods could be altered through the transmission device, but for convenience three or four pairs of rods are employed and even then it is sometimes necessary to change the angular position of the cage, so that the balancing can be done by one pair of rods and not two, as often happens at the beginning of the test.



The Vibrations of the Automobile Crank Shaft Are Nullified by Shifting, While the Machine is in Operation, the Bars of the Cage Suspended Underneath the Machine, and the Amount and Position of the Shift are Measures of the Unbalance Causing Vibration

Universal Horizontal Routing Machine

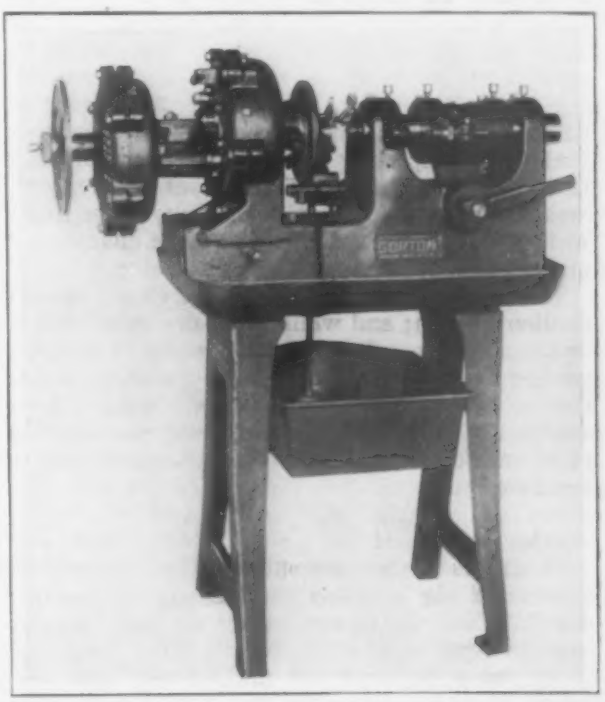
The routing of the vent and powder grooves in the fuse rings of shells is the special field covered by a machine that has been developed by the George Gorton Machine Company, Racine, Wis. This machine, designated by the builder as its No. 8-C universal, is designed to operate with the cutter running in a clockwise direction while the work rotates counter clockwise, or vice versa. This opposition of rotation is relied upon to give a smooth polished groove with a single cut, and to increase the output of each operator still further an effort has been made to simplify the operating mechanism so that one operator can handle three machines.

The spindle, which it is recommended should run at approximately 3200 r.p.m., is hardened and ground tool steel with combined radial and thrust ball bearings mounted in a sliding sleeve. Felt washers close the sleeve at both ends and are relied upon to prevent the escape of grease with which the sleeve is packed. A nut on the rear end of the spindle takes up the end play. The loose pulley is mounted independently of the spindle on ball bearings, which are also grease lubricated. The spindle and loose pulley sleeves are clamped together by a heavy yoke bored to fit them, an arrangement which is relied upon to bring the belt pull between the front and rear bearings and as far as possible keep the spindle from getting out of line.

The cutter is mounted in the spindle collet at the right of the machine. It is pointed out that this arrangement holds the cutter rigidly and at the same time enables changes to be readily made. A spacing pin in the collet is relied upon to keep the cutter from slipping back, and if the length or diameter of the cutter is changed, new spacing pins, having sufficient length to cause the cutter to project at least $\frac{3}{8}$ in., or different sizes of collets, can be supplied, the latter making it unnecessary to change the spindle.

The ring to be machined is clamped on a hardened and ground steel plate at the left by a drop forged support and hardened cam. The work holder bearing is of the builder's special type and runs in oil. Adjustments when necessary can be made easily and vibration has been eliminated. The stops are made of hardened tool steel and operate inside the work holder case. The output of the machine is between 25 and 30 rings per hour. The feed pulley is mounted on the rear case and operates the work holder by two pairs of spur reduction gears.

A cutter lubricating system, including pump, tank, strainer, relief valve, piping and flexible nozzle, is furnished with the machine. A pan is cast around the base of the machine to catch the lubricant and convey it to the tank, thus keeping the floor clean and free from chips. The machine as regularly furnished is mounted on legs, but if desired can be arranged for use on a bench, and the pump of the lubricating system omitted.



A Universal Horizontal Routing Machine for Cutting the Vent and Powder Grooves in Fuse Rings

The spindle, pump and feed pulleys are driven from a jackshaft which can be of a length sufficient to drive a number of machines.

The Steel Industry of Europe After the War

Position of Countries Which Produce Little or No Iron and Steel—Wide Variations in Per Capita Output

BY H. H. CAMPBELL

It is impossible to foretell what is going to happen to the steel industry after the war, but we can get the main facts together and at least understand the problem. We must first find out what position the different nations occupy as steel producers and what advantages they have in the way of raw materials.

Table A gives the output of coal, iron ore, pig iron and steel in the leading nations of Europe in the year 1913, with the record of the United States for comparison. The table also gives the pounds of steel produced per capita in each country.

TABLE A.

Production of Steel, Pig Iron, Ore and Coal in 1913. Note: 1 unit equals 1000 gross tons, except "pounds per capita"

	Steel	Pounds Per Capita	Pig Iron	Iron Ore	Coal
United States	31,301	700	30,966	61,980	508,893
Germany	18,959	650	19,309	35,941	191,511
Great Britain	7,664	380	10,260	15,997	287,430
Russia	5,111	70	4,756	10,000*	33,335
France	4,635	260	5,311	21,714	40,129
Austria-Hungary	2,683	120	1,758	3,039	16,337
Belgium	2,467	740	2,485	149	22,858
Italy	846	50	427	603	701
Sweden	583	240	735	7,476	364
Spain	320*	35	425	9,862	3,783

*Estimated.

ORE AND COAL

It might be supposed that we could find out the richness of the ore in any country from the relation between the output of ore and that of pig iron. Thus the United States produces just about two tons of ore for every ton of pig iron, and we know that our ore runs about 50 per cent in iron; but this method fails when we apply it to countries that either import or export a large proportion of their output. Thus Belgium raises no ore, yet it makes more steel per capita than any other nation, while Spain and Sweden export large quantities of ore but produce comparatively little iron.

The output of coal follows more closely the production of iron; and while there are exceptions we find that on the whole a nation which is a leading producer of steel mines a large quantity of coal. One or two countries have overcome natural disadvantages. Thus Sweden has hardly any coal and must use charcoal, while Italy imports fuel for smelting iron.

PIG IRON AND STEEL

There is no necessary connection between the amount of pig iron and the tonnage of steel produced. Thus Petrograd makes no pig iron, but imports it to make steel; on the other hand, Alabama made pig iron for many years but not a pound of steel. Moreover, there is a complication in steel statistics, for the figures usually given are the tons of ingots cast, while the scrap made in rolling will be put back into the melting furnaces and appear over and over again in the course of a year, and we know also that old material ultimately finds its way back to the steel works and appears again in the form of ingots.

The United States and Germany and other nations make just about a ton of steel for every ton of pig iron; but Great Britain produces only three tons of steel for every four tons of pig iron, because a great part of the iron smelted from the native ores of England is not well adapted for making steel, although it is excellent for foundry use. As a consequence, Great Britain exports large quantities of pig iron to Belgium, Germany, France, Russia and other countries. Conditions in Italy are just the opposite, for almost all the pig iron is melted in open-hearth furnaces with an equal amount of scrap, so that the tonnage of steel is twice that of pig iron.

POUNDS OF STEEL PER CAPITA

The amount of pig iron made or used per capita is often taken as a yardstick by which to measure the civilization of a nation; but it seems better to take the steel production. While on the one hand the tonnage of pig iron is a measure of real productive power, since practically every pound of pig iron is a new creation from crude ore, yet on the other hand the manufacture of steel shows a higher development of metallurgical science. We must also distinguish between production and consumption; but to find the amount consumed would require a long analysis of tables of imports and exports, an inquiry a little outside of our field, so that Table A shows the amount produced.

Belgium and the United States come first in the amount of steel made per capita, with Germany and Great Britain following. As just remarked, we should subtract something from the record of the leading producers to balance their exports, and we should add something to countries like Spain and Italy to make up for their imports; while, of course, the figures mean nothing if applied to a country like Holland, which makes no steel at all.

NON-PRODUCERS OF STEEL

Before taking up the leading iron-producing nations it may be well to say a word about those that do not loom large in the statistical tables. Norway, Denmark, Holland, Switzerland and Portugal produce practically no iron and mine hardly any ore or coal, so that they may be dismissed from consideration; but the Balkan states may not be disposed of so summarily, for travelers have told us of mineral deposits in those countries, albeit these stories have little weight with metallurgists. There may be coal there that will serve very well in a cook stove or a blacksmith's forge, but be useless for smelting pig iron; while an ore bed, which a newspaper correspondent would describe as "an inexhaustible supply," might last a modern blast furnace about a week.

The last edition of the Encyclopedia Britannica says that "Bosnia is rich in iron and coal," but in the Austrian official report we find that although Bosnia has been producing iron since 1881, the output in 1912 was only 145 tons per day, which could be made in one furnace of moderate size. The output of ore was 435 tons per day, and if this was all used to make the pig iron, it only contained 32 per cent of iron. These facts will indicate how

little reliance can be placed on general statements regarding natural resources.

SPAIN

Viewed as a producer of iron, Spain occupies a very small place in the world, but there are only four nations that produce more iron ore. From Roman times the iron made in the northern provinces has been renowned for its quality; and as there is coal near by, we have the essentials for a flourishing steel industry. Spain is, however, a backward country and the market for miscellaneous products is limited; as a consequence Spain has been selling her birthright for a mess of pottage and English iron masters years ago bought for a song the mines around Bilbao and for half a century have been carrying the ore away. Some has been and is still being shipped to Germany, France, Belgium and the United States, but the greater part goes to Great Britain.

For long years the average content of iron in the ore that is shipped has shown a steady decrease, mineral being mined to-day which would have been rejected a few years ago, and from time to time predictions have been made of the exhaustion of the deposits; but somehow these dire prophecies never have come true. It is certain that all the mines will not give out simultaneously and that the end will be long postponed by mining inferior ores, while it is quite possible that new deposits will be found. Nevertheless it seems more than probable that before many years the end must come to the huge exports of ore that have played so important a part in the international iron trade for fifty years.

SWEDEN

Sweden is known to every one as the producer of the best grade of wrought iron and steel, although she is cheated out of some of her just due because men will speak of Norway iron, just because it came from a Norwegian seaport. This superior quality is partly due to the purity of some of the Swedish ore and partly to the use of charcoal as fuel. There is no good coal in Sweden and so her iron masters have made a virtue of necessity and have devoted themselves exclusively to making pure iron and steel for special purposes.

Sweden is not of the first rank, if we merely speak of the tonnage of iron and steel produced, but is important as an exporter of iron ore and thus enters our problem, particularly with regard to England. There are large deposits north of the Arctic Circle, but the mineral is scattered irregularly in hard rock and much of it must be ground fine and magnetically concentrated. It is sent across Norway to get to an ice-free port and shipped to England, Germany and the United States.

From a geographical point of view this ore should all go to England, and in a certain measure we may say that it would make up the shortage that is bound to come when the mines of Spain run dry. But this Swedish ore costs more than the mineral that has been drawn from English-owned Spanish mines; it is more difficult to smelt and a large proportion of the output contains too much phosphorus to be suitable for the making of acid steel. These facts have an important bearing on the future of the steel industry of Great Britain.

ITALY

A generation ago Italy exported ore from the island of Elba, where mines were worked more than 2000 years ago; but the government has now practically commandeered what is left and reserved it for home consumption. As the reserve is small and as fuel must be imported from England, in the absence of any coking coal at home, it does not seem likely that Italy will develop into a formidable competitor for the iron trade of the world.

AUSTRIA-HUNGARY

Austria-Hungary raises a little more ore than is needed at home and sends the surplus to German Poland, but there is only one large deposit of fairly good ore in the dual empire, and this is in Styria in the south, as far as it could get from the best coal in the country. Since even this coal in the north gives a poor coke, the works in the south bring coke all the way from western Germany, this long railroad haul of blast furnace fuel being matched nowhere else in the world except in the trip from Connellsville to Chicago. From these facts it would seem that Austria will not be a big factor in the steel trade of the world in the near future.

RUSSIA

There are several old-established iron districts in Russia, but all save one can be eliminated at once from this review. The Moscow and Ural districts depend on charcoal for fuel; Petrograd uses imported coal and iron, while Poland has almost no ore and very poor coal, and is only kept alive by coke brought from Austria and by government help in the form of low freight rates on ore from southern Russia.

We have a different state of things in the south, near the Black Sea. Here there are extensive deposits of coal which are far from being of the best quality, but yield a coke suitable for blast furnaces. We also find here a bed of iron ore known as the Krivoi Rog. This ore is rich in iron and low in phosphorus, and if there were an unlimited amount of the mineral it might form the basis of a world-wide trade; but the end of the supply can be foreseen, and it is probable that about all the output of this region will be needed in Russia.

There are other beds of iron-bearing mineral in the Crimea, but it is difficult to get accurate information about them, for the ore occurs between strata of worthless earth and reliable observers have varied widely in their estimates of the quantity and quality of the reserve. The output of South Russia is constantly increasing, but there is no sign to-day that its plants can compete in price with the outside world.

GREAT BRITAIN, GERMANY, FRANCE AND BELGIUM

We have now considered all the nations of Europe except Great Britain, Germany, France and Belgium. These are the countries which have been in the past, and will be in the future, the most active competitors of the United States. They will be most affected by this war and we are more interested in their history and their future than in the story of other countries. We will therefore take up these nations more in detail in future articles.

The production of anthracite in 1915, as shown by the final figures compiled by C. E. Lesher of the United States Geological Survey, from returns made by the operators, was 79,459,876 gross tons, differing from the estimate of 79,100,000 tons published last January by less than one-half of 1 per cent. Compared with the figures for 1914, those for 1915 show a decrease of 2 per cent in quantity and 1.9 per cent in value. There were 148 machines used in underground mining of anthracite in 1915, and 57 steam shovels were used on the surface. The steam shovels are nearly all used in the Schuylkill and Lehigh regions, and the mining machines in the Wyoming region.

The Industrial Preparedness Inventory

Personnel of the Groups of Five Directors for Each State Appointed by Engineering Societies for the Naval Consulting Board

THE personnel of the groups of directors from each State charged with preparing an inventory of the country's manufacturing and producing resources as a first step in industrial preparedness has been announced and is given below. It will be recalled that the committee on industrial preparedness of the Naval Consulting Board of the United States, at the request of the President of the United States, secured the co-operation of five national engineering societies in appointing a representative in each State. As explained in THE IRON AGE of March 30, the plan is in part to arrive at the basis under which a state of preparedness may be maintained economically by placing small annual educational orders for army and navy supplies with thousands of establishments scattered throughout the country and by enrolling skilled labor as an industrial reserve. Howard E. Coffin, Hudson Motor Car Company, is general chairman, and W. S. Gifford, statistician of the American Telephone & Telegraph Company, is supervising director. The State directors, who become associate members of the Naval Consulting Board, are listed by States, and the order in which the names appear will indicate by what society each director was appointed—the first name in all cases being the appointment of the American Society of Civil Engineers, and the others in the order named being appointees of the mining, mechanical, electrical and chemical societies:

ALABAMA

J. S. Sewell, Alabama Marble Company, Gantt's Quarry; Priestly Toulmin, Lehigh Coal Company, Birmingham; F. H. Crockard, Tennessee Coal, Iron & Railroad Company, Birmingham; Theodore Swann, Alabama Power Company, Birmingham; B. B. Ross, Alabama Polytechnic Institute, Auburn.

ALASKA

John Wulzen, Alaska Gold Mines Company, Thane; Philip R. Bradley, Alaska Treadwell Gold Mining Company, Treadwell; George A. Diamond, Scheid & Co., Nome; Louis E. McCoy, Juneau; W. P. Lass, Juneau.

ARIZONA

J. B. Girand, city engineer, Phoenix; John C. Greenway, Calumet & Arizona Mining Company, Warren; A. G. McGregor, Calumet & Arizona Mining Company, Warren; David W. Jones, Arizona Copper Company, Ltd., Clifton; Frank N. Guild, University of Arizona, Tucson.

ARKANSAS

Charles H. Miller, Miller Engineering Company, Little Rock; J. R. Fordyce, Thomas Fordyce Mfg. Company, Little Rock; B. N. Wilson, University of Arkansas, Fayetteville; W. N. Gladson, University of Arkansas, Fayetteville; J. B. Rather, Agricultural Experiment Station, Fayetteville.

CALIFORNIA

Wynn Meredith, Sanderson & Porter, San Francisco; G. W. Dickie, San Francisco; C. W. Merrill, Merrill Metallurgical Company, San Francisco; A. H. Babcock, Southern Pacific Power Company, San Francisco; Edmund O'Neill, University of California, Berkeley.

COLORADO

H. S. Crocker, Denver; D. W. Brunton, Denver; T. B. Stearns, Denver; W. S. Aldrich, Colorado Agricultural College, Fort Collins; R. B. Moore, U. S. Bureau Mines, Denver.

CONNECTICUT

H. R. Buck, Ford, Buck & Sheldon, Inc., Hartford; Eli Whitney, N. & N. H. Trust Company, New Haven; H. B. Sargent, Sargent & Co., New Haven; Samuel Ferguson, Hartford Electric Light Company, Hartford; E. W. Morley, West Hartford.

DELAWARE

Andrew Bryson, Brylgon Steel Casting Company, New Castle; Thomas Coleman du Pont, 120 Broadway, New York City; R. W. Smith, Hilles & Jones Company, Wilmington; W. C. Spruance, Jr., E. I. du Pont de Nemours & Co., Wilmington; Chas. L. Reese, E. I. du Pont de Nemours & Co., Wilmington.

DISTRICT OF COLUMBIA

C. B. Hunt, Engineer Highways, D. C., Washington; Hennen Jennings, Washington; Dr. W. S. Stratton, Bureau of Standards, Washington; John H. Finney, Aluminum Company of America, Washington; Charles L. Parsons, U. S. Bureau Mines, Washington.

FLORIDA

L. R. McLain, St. Augustine; Robert N. Dickman, St. Augustine; R. E. Chandler, University of Florida, Gainesville; C. S. Hammatt, Consolidated Engineering Company, Jacksonville; E. R. Flint, University of Florida, Gainesville.

GEORGIA

G. R. Solomon, Solomon-Norcross Company, Atlanta; S. W. McCallie, State Geologist, Atlanta; Oscar Elsas, Fulton Bag & Cotton Mills, Atlanta; A. M. Schoen, Underwrtiers' Association, Atlanta; F. N. Smalley, Southern Cotton Oil Company, Savannah.

IDAHO

M. S. Parker, St. Maries; Stanley A. Easton, Kellogg; George F. Waddell, Squirrell, Fremont County; O. G. F. Markhus, Electric Investment Company, Boise; J. Shirley Jones, University of Idaho, Moscow.

ILLINOIS

R. W. Hunt, Chicago; Frederick K. Copeland, Sullivan Machinery Company, Chicago; Dr. W. F. M. Goss, University of Illinois, Urbana; P. Junkersfeld, Commonwealth Edison Company, Chicago; William Hoskins, Mariner & Hoskins, Chicago.

INDIANA

William K. Hatt, Perdue University, Lafayette; George P. Hulst, International Lead Refining Company, East Chicago; George O. Rockwood, Rockwood Mfg. Company, Indianapolis; F. S. Hunting, General Electric Company, Fort Wayne; H. E. Barnard, State Food & Drug Inspector, Indianapolis.

IOWA

George H. Boynton, Northern Gravel Company, Muscatine; E. A. Sayre, Eagle Coal & Mining Company, Des Moines; S. M. Woodward, State University of Iowa, Iowa City; Norman T. Wilcox, Mississippi River Power Company, Keokuk; W. T. Coover, Iowa State College, Ames.

KANSAS

D. H. Whitmer, Whitmer Contracting Company, Pittsburg; H. G. Hixon, Prime Western Spelter Company, Iola; A. A. Potter, Kansas State Agricultural College, Manhattan, Kan.; George C. Shaad, University of Kansas, Lawrence; W. A. Whitaker, University of Kansas, Lawrence.

KENTUCKY

Richard Montfort, Louisville & Nashville Railroad, Louisville; Frank D. Rash, Bernard Mining Company, Earlington; W. S. Speed, Louisville Cement Company, Louisville; Carl P. Nachod, Nachod Signal Company, Louisville; A. M. Breckler, Janes & Breckler, Louisville.

LOUISIANA

Arsene Perrilliat, Hercules Company, Ltd., New Orleans; unassigned; A. M. Lockett, A. M. Lockett Co., Ltd., New Orleans; M. S. Sloan, New Orleans Railway & Light Company, New Orleans; W. L. Howell, Appraiser's Laboratory, Custom House, New Orleans.

MAINE

E. C. Jordan, Portland; R. H. Richards, Massachusetts Institute Technology, Boston; J. S. Hyde, Bath Iron Works, Bath; W. S. Wyman, Central Maine Power Company, Augusta, unassigned.

MARYLAND

H. D. Bush, Carnegie Steel Company, Baltimore; W. H. Peirce, Baltimore Copper Smelting & Rolling Company, Baltimore; C. C. Thomas, Johns Hopkins University, Baltimore; J. B. Whitehead, Johns Hopkins University, Baltimore; W. B. D. Penniman, Penniman & Browne, Baltimore.

MASSACHUSETTS

Fayette S. Curtis, Old Colony Railroad Company, Boston; W. E. C. Eustis, Boston, Mass.; Ira N. Hollis, Worcester Polytechnic Institute, Worcester; C. L. Edgar, Edison Electric Illuminating Company, Boston; A. D. Little, A. D. Little, Inc., Boston.

MICHIGAN

G. S. Williams, Ann Arbor, Mich.; M. M. Duncan, Cleveland Cliffs Iron Company, Ishpeming; Alex Dow, Detroit Edison Company; H. H. Crowell, Michigan Railway Company, Grand Rapids; H. T. Graber, Digestive Ferments Company, Detroit.

MINNESOTA

William L. Darling, Northern Pacific Railroad, St. Paul; H. V. Winchell, Minneapolis; J. J. Flather, University Min-

Minneapolis; William N. Ryerson, Great Northern Power Company, Duluth; G. B. Frankforter, University of Minnesota, Minneapolis.

MISSISSIPPI

M. L. Lynch, Jackson; no resident member; R. C. Carpenter, Agricultural College, Miss.; J. T. Robertson, Mississippi Inspection & Advisory Rating Company, Vicksburg; William F. Hand, Mississippi Agricultural and Mechanical College, Agricultural College, Miss.

MISSOURI

Daniel Bontecou, Kansas City; P. N. Moore, St. Louis; E. Flad, St. Louis; Charles S. Ruffner, Mississippi River Power Distributing Company, St. Louis; L. F. Nickell, Washington University, St. Louis.

MONTANA

Eugene Carroll, Butte Water Company, Butte; J. L. Bruce, Butte & Superior Copper Company, Butte; C. V. Nordberg, Nordberg Mfg. Company, Butte; M. H. Gerry, Jr., Engineering Corporation, Helena; E. P. Mathewson, Anaconda Copper Mining Company, Anaconda.

NEBRASKA

Elliot Holbrook, Southern Pacific Company, Omaha; Walter T. Page, American Smelting & Refining Company, Omaha; William R. McKeen, McKeen Motor Car Company, Omaha; H. A. Holdredge, Omaha Electric Light & Power Company; C. F. Crowley, Creighton University, Omaha.

NEVADA

W. T. Gould, Nevada-California-Oregon Railway, Reno; W. E. Trent, Trent Engineering Company, Reno; James G. Scrugham, University of Nevada, Reno; W. K. Freudenberger, Public Service & Railroad Commissioners of Nevada, Carson City; Maxwell Adams, University Nevada, Reno.

NEW HAMPSHIRE

Robert Fletcher, Thayer School of Engineering, Hanover; H. R. Batcheller, Washington, N. H.; Thomas W. Fry, Sullivan Machinery Company, Claremont; J. Brodie Smith, Manchester Traction, Light & Power Company; Hugh K. Moore, Berlin Mills Company, Berlin.

NEW JERSEY

Morris R. Sherrerd, Department Public Works, Newark; B. F. Cresson, Jr., New Jersey State Board Commerce & Navigation, Jersey City; H. L. Gantt, New York City; Farley Osgood, Public Service Electric Company, Newark; H. S. Miner, Welsbach Light Company, Gloucester.

NEW MEXICO

O. H. B. Turner, St. Louis, Rocky Mountain & Pacific Company, Raton; Stephen O. Andros, Albuquerque; L. J. Charles, U. S. Reclamation Service, Elephant Butte; J. L. Brenneman, University of New Mexico, Albuquerque; John D. Clark, University of New Mexico, Albuquerque.

NEW YORK

James G. White, J. G. White & Company, New York; Chas. F. Rand, Spanish-American Iron Company, New York; W. H. Marshall, American Locomotive Company, New York; Wm. McClellan, New York; T. B. Wagner, Corn Products Refining Company, New York.

NORTH CAROLINA

J. L. Ludlow, Winston-Salem; Joseph H. Pratt, state geologist, Chapel Hill; Wm. S. Lee, Southern Power Company, Charlotte; Chas. I. Burkholder, Southern Power Company, Charlotte; F. P. Venable, University of North Carolina, Chapel Hill.

NORTH DAKOTA

T. R. Atkinson, city engineer, Bismarck; no resident member; Calvin H. Crouch, University of North Dakota, University; John F. Stevens, University of North Dakota, University; Edwin F. Ladd, North Dakota Agricultural College, Fargo.

OHIO

Chester W. Larner, Wellman-Seaver-Morgan Company, Cleveland; Chas. S. Robinson, Youngstown Sheet & Tube Company, Youngstown; Frank A. Scott, Warner & Swasey Company, Cleveland; Samuel G. McMeen, Ohio State Telephone Company, Columbus; James R. Withow, Ohio State University, Columbus.

OKLAHOMA

H. V. Hinckley, Oklahoma City; M. M. Valerius, Valerius, McNutt & Hughes, Tulsa; unassigned; H. V. Bozell, State University of Oklahoma, Norman; Edwin DeBarr, University of Oklahoma, Norman.

OREGON

Geo. C. Mason, Hurley-Mason Company, Portland; A. M. Swartley, Bureau Mines & Geology, Corvallis; Bert C. Ball, Willamette Iron & Steel Works, Portland; O. B. Coldwell, Portland Railway Light & Power Company, Portland; O. F. Stafford, University of Oregon, Eugene.

PENNSYLVANIA

Geo. S. Davison, Gulf Refining Company, Pittsburgh; Vance C. McCormick, Harrisburg; Julian Kennedy, Pittsburgh; Paul Spencer, United Gas & Improvement Company, Philadelphia; R. F. Bacon, University of Pittsburgh, Pittsburgh.

RHODE ISLAND

John W. Ellis, Providence Gas Company, Providence; Walter M. Saunders, Saunders & Franklin, Providence; Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence; L. W. Downes, D. & W. Fuse Company, Providence; J. E. Bucher, Brown University, Providence.

SOUTH CAROLINA

John McNeal, city engineer, Columbia; H. L. Scaife, Clinton; J. L. Coker, Jr., Carolina Fiber Company, Hartsville; W. M. Riggs, Clemson Agricultural College, Clemson College; R. N. Brackett, Clemson Agricultural College, Clemson College.

SOUTH DAKOTA

Bruce C. Yates, Homestake Mining Company, Lead; Allan J. Clark, Homestake Mining Company, Lead; M. W. Davidson, University of South Dakota, Vermillion; B. B. Brackett, South Dakota State College, Brookings; Wm. J. Sharwood, Homestake Mining Company, Lead.

TENNESSEE

Wm. W. Carson, University of Tennessee, Knoxville; A. A. Blow, Carolina Copper Company, Knoxville; N. Sanders, Newell Sanders Plow Company, Chattanooga; F. G. Proutt, Memphis; J. F. Norris, Vanderbilt University, Nashville.

TEXAS

Jno. B. Hawley, Fort Worth; Arthur J. McQuatters, El Paso; W. B. Tuttle, San Antonio Traction Company; Fred A. Jones, Dallas; Geo. W. Gray, Texas Company, Houston.

UTAH

A. F. Parker, Ogden; Lafayette Hanchett, Nat. Copper Bank, Salt Lake City; Wm. Wraith, Inter. Smelting Company, Salt Lake City; Markham Cheever, Utah Power & Light Company, Salt Lake City; Wm. C. Ebaugh, U. S. Smelting Company, Salt Lake City.

VERMONT

Frank O. Sinclair, Burlington; C. B. Hollis, Eastern Talc Company, Randolph; James Hartness, Jones & Lamson Machine Company, Springfield; B. T. Burt, Rutland Railway, Light & Power Company; G. H. Burrows, University of Vermont, Burlington.

VIRGINIA

E. T. D. Myers, Jr., Commonwealth Coal Corporation, Richmond; Frank U. Humbert, Low Moor Mining Company, Low Moor; W. D. Mount, Mathieson Alkali Works, Saltville; Walter S. Rodman, University of Virginia, University; Frank B. Carpenter, Virginia-Carolina Chemical Company, Richmond.

WASHINGTON

A. O. Powell, Seattle; J. C. Ralston, Pacific Coast Pipe Company, Spokane; James V. Paterson, Seattle Construction & Dry Dock Company, Seattle; John Harisberger, Puget Sound Traction, Light & Power Company, Seattle; H. K. Benson, University of Washington, Seattle.

WEST VIRGINIA

A. M. Scott, Charleston; I. C. White, state geologist, Morgantown; Chas. E. Ward, Charles Ward Engineering Works, Charleston; H. S. Sands, H. S. Sands Electric & Manufacturing Company, Wheeling; A. R. Whitehill, West Virginia University, Morgantown.

WISCONSIN

D. W. Mead, University of Wisconsin, Madison; F. W. O'Neill, Nordberg Mfg. Company, Milwaukee; L. E. Strothman, Allis-Chalmers Mfg. Company, Milwaukee; A. W. Berresford, Cutler-Hammer Mfg. Company, Milwaukee; C. F. Burgess, C. F. Burgess Laboratories, Madison.

WYOMING

Edward Gillette, Sheridan; W. D. Waltman, Franco-Wyoming Oil Company, Casper; E. G. Hoefer, University of Wyoming, Laramie; P. N. Nunn, Wyoming Electric Company, Casper; R. B. Moudy, University of Wyoming, Laramie.

The Jeffrey Mfg. Company, Columbus, Ohio, has organized a contractors' plant department to handle the sale of a line of small rock and ore crushers, with which will be furnished the Jeffrey line of elevators, conveyers and screens. The department will specialize in the manufacture of small crushers only, which will fit in with certain well established Jeffrey lines, such as pulverizers, loaders and sand and gravel machinery. These machines have been developed and are particularly adapted for use in road building, contracting, mining, rock crushing, in connection with pulverizers, in gravel plants and in block and tile plants. Leroy A. Kling, formerly sales manager of the road machinery and limestone crusher department of the Wheeling Mold & Foundry Company, Wheeling, W. Va., will be in charge of this department.

February Export Values Make New Record

Values of Iron, Steel and Machinery Exports for Eight Months Show Gain of Nearly 200 Per Cent Over Same Period in 1915

WASHINGTON, D. C., April 17, 1916.—All records fell before the enormous total of our exports of iron and steel and manufactures thereof in February, which were valued at $54,155,386, according to figures compiled by the Bureau of Foreign and Domestic Commerce. The next largest month in the history of the country was January of this year, when the total value was $51,643,807. For the eight months ended February the unprecedented aggregate of $355,120,855 was recorded, a gain of nearly 200 per cent over 1915, and more than 75 per cent over the previous record figures for the eight months of 1913. The following table shows the total of such exports by months for the eight months' periods ended February, 1916 and 1915:

Iron and Steel Exports by Months for Eight Months

	1915	1914
July	$35,891,575	$16,737,552
August	37,726,822	10,428,817
September	38,415,180	12,531,102
October	43,602,741	16,455,832
November	48,056,220	15,689,401
December	45,825,277	14,939,613
	1916	1915
January	51,643,807	18,053,421
February	54,155,386	16,470,751
Eight months	$355,120,855	$121,306,489

But for the fact that February included only 24 official working days, the exports of both tonnage iron and steel commodities and of machinery would have come within a hair's breadth of surpassing all previous monthly records. As it was, shipments of machine tools forged ahead of the huge total recorded in November and set a new export mark for this important class of machinery. Exports of tonnage commodities in February, 368,820 gross tons, exceeded January, 357,121 tons, and fell but little short of the high figures of last August and September, 401,298 and 381,317 tons, respectively. On a basis of value all records were beaten. Shipments of machinery in February surpassed those of the same month of 1915 by 76 per cent and have been exceeded in only two months during the extraordinary boom that began a year ago. For the eight months ended February 29, 1916, the exports of tonnage commodities showed an increase of 200 per cent over the same period of 1915 and of 100 per cent as compared with the record total for the like period of 1914. Exports of machinery for the eight months of 1916 gained 100 per cent over 1915 and 25 per cent over the high water mark of 1913.

EXPORTS OF IRON AND STEEL

The exports of iron and steel for which quantities are given aggregated 368,820 gross tons in February, 1916, as compared with 144,553 tons in February, 1915. The total for the eight months ended February was 2,963,855 gross tons as compared with 988,947 tons in 1915.

The following table shows the exports of tonnage iron and steel in February and for the eight months ended February, 1916, as compared with 1915:

Exports of Iron and Steel

	February		Eight Months	
	1915, Gross Tons	1916, Gross Tons	1915, Gross Tons	1916, Gross Tons
Pig iron	14,178	15,061	66,453	171,708
Scrap	3,017	9,371	13,627	84,866
Bar iron	658	5,174	4,067	41,586
Wire rods	10,864	13,764	43,369	111,819
Steel bars	20,225	53,894	101,585	371,125
Billets, ingots and blooms, n.e.s.	15,697	87,306	55,295	506,461
Bolts and nuts	1,000	2,735	8,332	21,497
Hoops and bands	1,161	4,559	7,207	27,137
Horseshoes	326	958	6,029	9,876
Cut nails	193	176	1,359	2,944
Railroad spikes	547	4,160	3,701	16,657
Wire nails	3,989	9,522	30,032	77,016
All other nails, including tacks	435	456	2,421	6,636
Cast-iron pipes and fittings	2,180	4,841	44,405	34,027
Wrought pipes and fittings	3,877	6,783	67,499	84,477
Radiators and cast-iron boilers	173	195	2,037	1,702
Steel rails	9,124	34,630	82,983	371,817
Galvanized iron sheets and plates	3,689	5,537	25,827	50,402
All other iron sheets and plates	921	4,605	4,611	27,013
Steel plates	8,336	19,272	64,769	190,260
Steel sheets	6,985	8,079	63,097	61,564
Structural iron and steel	12,733	18,880	102,033	180,304
Tin and terne plates	5,835	13,534	45,849	133,389
Barb wire	5,786	29,577	73,431	222,617
All other wire	12,624	15,751	68,929	156,955
Total	144,553	368,820	988,947	2,963,855

MACHINERY EXPORTS

The exports of machinery in February, 1916, were valued at $13,945,347 as compared with $7,936,467 in the same month of 1915 and $8,048,568 in February,

Exports of Machinery

	February		Eight Months	
	1915	1916	1915	1916
Adding machines	$45,031	$97,707	$311,135	$536,862
Air-compressing machinery	35,300	42,027	228,447	348,724
Brewers' machinery	5,583	179	89,994	19,784
Cash registers	59,089	70,259	945,801	802,862
Parts of	4,532	2,156	76,552	70,674
Cotton gins	1,513	16,893	28,072	55,458
Cream separators	3,292	71,376	107,857	328,855
Elevators and elevator machinery	46,875	72,343	551,357	858,142
Electric locomotives	13,126	134,405	217,534	379,592
Gas engines, stationary	11,885	25,026	301,276	223,267
Gasoline engines	340,001	880,490	2,303,913	5,303,948
Steam engines	126,720	280,207	1,646,183	11,428,888
All other engines	49,017	371,480	373,913	1,196,645
Parts of	154,589	537,457	1,589,246	4,255,179
Laundry machinery, power	21,188	10,959	162,546	166,402
All other	28,974	26,512	154,413	195,186
Lawn mowers	53,730	26,317	178,970	120,793
Metal-working machinery (including machine tools)	2,523,722	4,662,905	13,499,973	29,859,822
Meters, gas and water	25,367	24,565	211,691	165,047
Milling machinery (flour and grist)	86,129	196,046	550,313	1,780,488
Mining machinery:				
Oil-well machinery	93,513	128,180	1,467,521	785,711
All other machinery	438,578	507,528	2,723,480	4,275,133
Paper-mill machinery	37,852	81,316	404,504	654,735
Printing presses	173,772	130,703	941,666	1,001,855
Pumps and pumping machinery	158,146	400,106	1,568,345	2,919,467
Refrigerating and ice-making machinery	54,047	54,358	309,471	484,842
Sewing machines	539,431	501,920	4,065,058	3,594,626
Shoe machinery	116,866	98,373	741,378	926,761
Sugar-mill machinery	201,124	275,648	1,481,622	5,177,739
Textile machinery	161,245	188,929	992,123	1,405,803
Typesetting machines	22,470	88,351	540,086	414,161
Typewriting machines	436,548	799,375	2,902,165	5,453,541
Windmills	49,091	76,255	445,456	630,527
Wood-working machinery, saw mill	24,407	32,426	163,149	203,714
All other	65,864	55,861	416,957	762,491
All other machinery and parts of	1,727,850	2,976,709	10,236,873	19,601,723
Total	$7,936,467	$13,945,347	$52,929,040	$106,389,447

1914. Shipments of metal-working machinery, which reached a record total in November last, showed a further increase, the aggregate for February being $4,662,905 as compared with $2,523,722 in the same month of 1915 and $1,102,207 in February, 1914.

Details of the exports of machinery for February, 1915 and 1916, and for the two eight months' periods are shown in the accompanying table.

IMPORTS OF IRON AND STEEL

Imports of tonnage iron and steel amounted in February, 1916, to 20,279 gross tons as compared with 7505 tons in the same month of 1915. The total for the eight months ended February, 1916, was 215,231 tons against 165,512 tons for the same period of 1915.

The following table shows the imports of tonnage commodities for February and for the eight months ended February, 1916, as compared with 1915:

Imports of Iron and Steel

	February,		Eight Months,	
	1915, Gross Tons	1916, Gross Tons	1915, Gross Tons	1916, Gross Tons
Ferrosilicon	555	533	4,360	3,042
All other pig iron	1,132	9,642	77,506	73,993
Scrap	2,050	5,052	23,456	75,986
Bar iron	1,734	206	9,882	5,009
Structural iron and steel	240	192	5,177	932
Hoop or band iron	....	....	....	470
Steel billets without alloys	17	2,261	885	5,720
All other steel billets	618	908	19,569	6,298
Steel rails	419	762	15,261	39,187
Sheets and plates	151	167	2,156	1,120
Tin and terne plates	266	107	4,555	450
Wire rods	323	449	2,705	3,024
Total	7,505	20,279	165,512	215,231

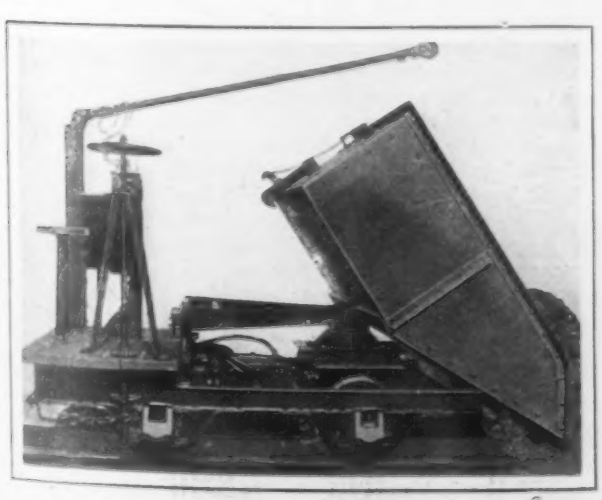
While the February imports of tonnage commodities represent a gain of nearly 200 per cent over the same month of 1915, they show a 40 per cent decline as compared with the high figures of December, 1915.

W. L. C.

Motor-Driven End and Side Dump Car

The Orenstein-Arthur Koppel Company, Koppel, Pa., has built an all round dump car with motor drive and a standard trolley pole. The car is designed for handling waste material, as from a mine tipple to the dump, replacing the ordinary car hauled by mules. With this type of car the self-dumping feature is secured and it is possible to dispense with the tipple at the dump.

The new car is self-propelling at a relatively high rate of travel and no special dumping mechanism is needed at the disposal point. It is possible for one man to handle it and the material can be dumped on either side or at the end of the track as may be desired. This feature, it is emphasized, does away with the necessity for moving the tipple and provides for a comparatively even distribution of material. The capacity of the car is 54 cu. ft., the dimensions being over-all length 80 in., width 70 in. and height 56 in. Any gage from 36 in. up to the standard of 56½ in. can be furnished and either direct or alternating current motors can be supplied.



A Motor-Driven Dump Car Capable of Discharging Material at the End or the Side of the Tipple

A GERMAN DUMPING CASE

Effort to Import Automobile Ball Bearings at a Low Valuation

Board 1, of the reappraisement division, customs service, New York, recently disposed of a case involving automobile ball bearings shipped to this country by members of a German cartel. The question up for settlement had to do with the discounts claimed by the American handlers when making entry of the goods. The shipments were made between May, 1914, and Jan. 11, 1915. Much delay, however, was experienced in getting evidence from Germany, owing to war conditions. Following the usual practice in reappraisement cases, the identity of the importers was not revealed. Government officials stated that the cases before the board were striking examples of the methods pursued by the German cartels in "dumping" goods in foreign markets with a view to stifling, as in this instance, domestic competition. Several hearings were held and a large number of witnesses, both for the importers and the Government, testified. There also was evidence submitted by treasury agents working on the cases in Europe.

According to what could be learned from the reappraisement officials, the method followed by the members of the cartel in getting a grip on the American market was to invoice or enter the bearings at a fairly representative price for alleged similar merchandise selling in Germany at the date of export, and then, when making entry at the American customs house, claim a heavy discount from the invoiced or entered values. Care was taken in entering the goods at a fair price in order to avoid additional duties and accruing penalties at the hands of the customs officials, the chief reliance being on the heavy discounts to be allowed by the authorities. This plan, it was stated, worked well for a considerable period, but at last complaints of domestic manufacturers brought action by the Treasury Department in the shape of an investigation here and in Germany.

This was followed by the customs men cutting down the discounts in drastic fashion. The outcome was an appeal by the importers, or agents of the cartel, for a review of the New York collector's action. It was claimed by the German interests at the trial that the cutting down of the discount allowances was not warranted by the evidence in the possession of the Government, the further contention being that the disallowance of the discounts claimed had the effect of making the ball bearings sell here at prices too high to be satisfactory either to the manufacturers in Germany or the importers in this country. John J. Mulvaney, appearing in behalf of the Department of Justice, told the board that, while the importers were claiming a discount of 56 per cent, the Government had figured out that 40 per cent was nearer the proper rate. The importers set up the claim that the discount claimed was equitable since the bearings shipped to this country differed in quality from bearings sold in Germany. This was denied by the Government counsel.

The board, after considering the testimony, handed down a decision, which while very unsatisfactory to the Government, did, nevertheless, cut down most of the discounts considerably. In the case of the Erste Automatische Gussstahlkugelfabrik, of Schweinfurt, the board held that instead of discounts of 56 per cent, the rebate should be 50 per cent. Fichtel & Sachs, likewise of Schweinfurt, also members of one of the German cartels, entered their bearings at discounts of 54 per cent and 2 per cent. As reappraised finally by the board a straight discount of 50 per cent was allowed. It seemed to be the idea in Assistant Attorney General Hanson's office that, with the light thrown upon the operations of the ball-bearing cartels in the cases just decided, future cases of the kind affecting different lines of merchandise, as well as bearings, might result in the full contentions of the Government being upheld. The fact that the decision in the present cases was in the nature of a compromise was ascribed to the conflicting testimony given at the trial.

PURCHASING LARGE MACHINERY*

The Three Methods Followed and What They Have Produced

The purchase of large machinery is an engineering problem. It rarely happens that conditions are such that what was built for one service will do for another. The demand for added economies is regular and progressive. Even the materials to be used are changing their character, and competition of type is a factor as well as competition in price. Practically none of this class of machinery is manufactured as a whole, although certain parts may well be.

In general two methods have been followed. In the first and what has been called the English method, the purchaser's engineer prepares detailed plans and specifications on which bids are taken in the customary way, an award is made and the successful bidder builds the apparatus. He may or may not be responsible for the results. If he is responsible for results, he is usually allowed to vary the details to some extent.

The second method has perhaps been more used in this country. Here the purchaser furnishes a specification setting forth the conditions of the problem, the end to be sought and certain sizes to be observed. He also specifies an economical performance to be reached to be guaranteed by the contractor. There may or may not be a bonus and penalty clause for performance, also provision for an economy test. Bids are taken on this specification and an award made. The successful bidder builds the apparatus.

FAULTS OF THE TWO GENERAL METHODS

Both of these methods are faulty. The first method leads to excessive cost and the perpetuation of fads, to higher maintenance, and the economies as a general rule are not so good as they might be. The second method usually secures a machine not quite fitted for the work, high maintenance and undesirable operating kinks, and a set of constructional details adapted from some other type of apparatus. The economies may be up to guarantee and usually are, but the over-all economies are not bettered in the way they should be.

This second method has more vogue in this country because the control of American companies is more largely financial than technical and the tendency is to let experimenting be done by others. Here the responsibility for design and results is put up to the contractor and the apparatus is never quite up to the state of the art, as he too will not use his latest knowledge to any extent. He will use all the well-tried devices, will make small economies everywhere and meet the guarantees, but his latest knowledge will be reserved for the second or third proposition beyond this one.

Under the first method much good work has been done, but the scrap heap has been enlarged much more under the second method. The chief advantage is secured where the purchaser's engineer is unhampered in his design, always stipulating that he is a high-grade engineer with few fads and a broad acquaintance with the art.

COMBINING THE TWO METHODS

The best results may be secured by a combination of the two methods, bearing in mind that the best engineering is one man's work, although he should have many advisers.

The purchaser's engineer here prepares a skeleton specification with certain plans and details on which proposals are selected as being the best and a series of consultations take place in which the entire problem is gone over in an engineering way, with the engineers of each bidder. During these consultations the specifications may have undergone changes and been added to until it is no longer a skeleton, and at the end the selected bidders make their final proposal. Sometimes only one bidder might be selected or it might even be found necessary to start all over again. Frequently it has been found necessary to go outside of the regular line of contractors on a certain line of apparatus in order to get the required results and more frequently improvements and means of economies must be brought to their attention and the adaptability of well-known types of apparatus in other fields suggested to them.

I have known cases where the entire plant was detailed in the engineer's office. A saving of 50 per cent in the operating cost was attained and similar economies have been reached by using contractors' designs, but these cases are usually exceptional or occur in remodeling old plants. With the combination method economies of 10 to 15 per cent have been readily secured in first-class plants, perhaps at that time all the state of the art would allow.

FORCING THE HAND OF THE MANUFACTURER

Manufacturers' representatives frequently say, "We do not care for that kind of business; our shops are full and it upsets our work; we cannot afford to touch it." The answer invariably should be: "You can't afford to pass it by, even if you should take the business at a loss, for some one will take it, and if the economies are sufficient you will have to build it in the end and pay them for the privilege."

The position of the engine-building shops 15 years ago and to-day well illustrates this phase of the subject. It is not, perhaps, too much to say that many of our great steps in the engineering arts have come with the purchasing of large machinery by the last plan. In the early days of the electric-lighting industry Mr. Edison, looking ahead as he always did, designed his largest generator for direct connection to a high-speed engine. The Jumbo units installed at the old Pearl Street Station in New York were the result. But standardization made the belted plant common and almost universal. It was a common practice to put two flywheels on a 500-hp. high-speed engine, and, running double belt on each flywheel, to connect four 62-kw. generators to each engine. I am credibly informed that a station with 10 such units was in operation within two years.

Engineering purchasers finally brought the multipolar machine and the engine into direct connection which resulted in the so-called heavy-duty type of frame.

The use of the centrifugal pump for boiler feeding was forced on the manufacturers, who much preferred to furnish the standard article.

In the fields of mining and metallurgy there are many illustrations. The handling of material, cleaning of gases, types of furnaces, introduction of new processes, all bear evidence that this third method has been long used.

The early development of the open-hearth furnace, as told by S. T. Wellman, illustrates the taking advantage of the best talent available in the design and purchase of large machinery, and the development of the rolling mill has been the product of both the purchasers and contractors' engineers in consultation.

In this era of change and progress our engineers interested in large machinery should keep closely in touch with the contractors' engineers and with the state of the art in other industries. The results of a small experimental machine in one industry may set the pace for a great step in another widely different industry. Certain results in South Africa are applicable in Pittsburgh, and data secured in Paris have been applied in Butte, while certain developments in New York have found their best field in Germany.

The purchaser of large machinery must be broad, as is consistent with his knowledge, of judicial mind, reasonably quick in decision and with as wide an acquaintance with the art as possible. Such an engineer will not take up fads, will know within reason what his limits are, and will not be frightened by cost in block, knowing that it is cost per unit of output that counts in the result.

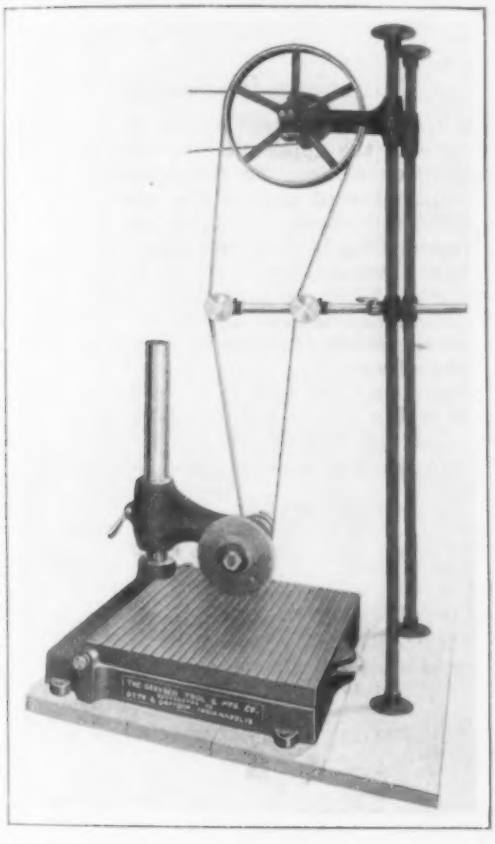
*From a paper read April 4 before the Mechanical Section of the Engineers' Society of Western Pennsylvania by George A. Orrok, mechanical engineer, New York Edison Company.

The Pulsometer Steam Pump Company has moved its general offices from 17 Battery Place, New York, to 485 South Twenty-first Street, Irvington, N. J. A New York office will be maintained at 35 Thomas Street.

A New Type of Bench Grinding Machine

The Grayson Tool & Mfg. Company, Indianapolis, Ind., is manufacturing a bench machine especially adapted for grinding dies, punches, blocks, gages, etc. The wall bracket of the machine, which has a reach of 8½ in., is carried on a vertical 12-in. column, thus providing a wide range for different kinds of work.

The machine has a 12 x 14-in. table that is cross-lined for dust and dirt clearance. The vertical feed for the work is provided by a pivot arrangement on the side of the table next to the column. The table is hinged nearest the column and a large knurled screw under the opposite edge provides for feeding the work up to the grinding wheel. The wheel spindle, which is of hardened and ground high-carbon steel, is provided with bronze bearings, protected with dust caps.



A Recently Developed Bench Machine for Grinding Dies, Punches, Blocks, Gages, Etc.

The outfit, in addition to being made with a self-contained countershaft, is also supplied with a wall countershaft when required to meet local conditions.

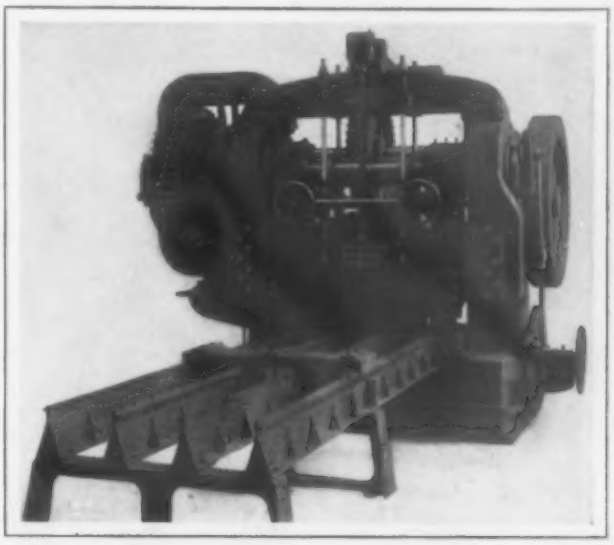
Copper-Boron Alloy for Copper Castings

The incorporation of boron in copper, in the way that graphite exists in cast iron, is the principle on which a patent (U. S. 1,169,536—Jan. 25, 1916) has been granted to Edward D. Gleason, of New York, and assigned to the New Metals & Process Company, Brooklyn, N. Y. The boron is introduced into the copper by fusing them in a crucible, free from impurities, with a flux consisting of native calcium fluoride and fused boracic acid. This alloy is recommended as a material for addition to molten copper to give sound castings, free from oxides and blowholes. The alloy can be added also to alloys of copper and lead, copper, lead and tin, etc., with beneficial results.

A voluntary petition in bankruptcy has been filed at Memphis, Tenn., by the Chickasaw Iron Works, through Israel Peres, attorney, the petition setting forth that the company has liabilities of $104,612.61 and assets of $144,587.46. Both plants of the company are involved. Joseph E. Dolan is president and R. McFarquhar is secretary.

A Recent Multiple Punching Machine

A new machine for manufacturing mine screens and other perforated work of that nature has been placed on the market by the Hilles & Jones Company, Wilmington, Del. It is a double-housing multiple



A Double-Housing Multiple Punching Machine Equipped with an Automatic Spacing Table for Mine Screens and Similar Perforated Work

punching machine measuring 62 in. between the housings combined with an automatic spacing table and having sufficient capacity to punch 35 holes 1½ in. in diameter through a ¼-in. mild steel plate or 14 holes of the same size through a ½-in. plate.

The plates to be punched are passed through from the back of the machine and are held by grips attached to a carriage receiving power through a rack and pinion drive. The maximum width of plates handled is 5 ft., which gives a clearance of 1 in. on each side between the edge of the plate and the housing, but the grips can be adjusted across the carriage to accommodate the narrower plates. The spacing table is arranged to handle plates 5 ft. wide and twice that length and has a handwheel if it is desired to operate the table by hand. The sliding head containing the punches has an adjustment controlled by handwheels operating together, and it is possible to vary the distance between the punches between ½ and 3 in. by 1-16-in. intervals. An automatic stripping device, which is operated by cams from the main eccentric shaft, is provided to hold the plates in place when the punches ascend.

The machine is driven by an electric motor mounted on a bracket bolted to one of the housings. The power is transmitted directly to the driving shaft through cut gears. Heavy brackets are provided for the outer ends of the driving shaft so that there are no overhanging gears.

New England Foundrymen's April Meeting

The monthly meeting of the New England Foundrymen's Association was held at the Exchange Club, Boston, April 12. The chief speaker was Lieut. Alfred H. Miles, U. S. N. His topic was "Submarines" and his address, illustrated with colored slides, was made most interesting because of his knowledge of the subject gained by his five years' service with the United States submarine flotilla as commanding officer and division commander. W. H. Barr, president, and H. J. Boggis, vice-president of the National Founders' Association, were present and told of the activities of the organization and the condition of the foundry business throughout the country. The next meeting of the association will be held in Hartford, Conn., May 10.

Michlovitz & Co., Harrisburg, Pa., have purchased the plant and all the scrap of the Brandywine Iron & Metal Company, Lebanon, Pa.

Assembling Motor Truck Engines

In the truck department of the Packard Motor Car Company, Detroit, Mich., the progressive system of assembling has been adopted, as it has been for some time in the pleasure-car department, as illustrated in detail in these columns Oct. 14, 1915. With this system the upper half of an aluminum crankcase starts in at one end of a 300-ft. track and comes out a complete truck motor at the other, the various parts having been put in place by the assembling force as it traveled.

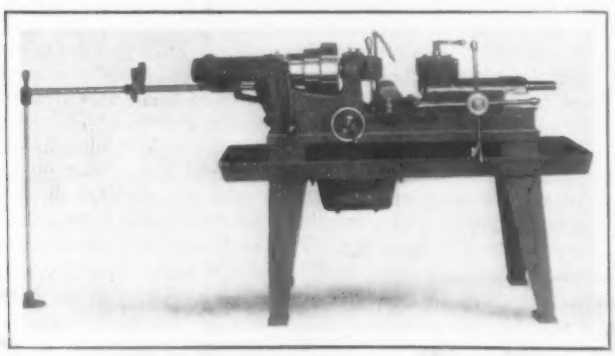
The End of a 300-Ft. Track Used in the Packard Motor Car Company's Plant to Assemble Engines for Motor Trucks

The track, the finish edge of which is shown in the accompanying illustration, is made of steel tubing 1 in. in diameter supported by cast-iron standards 23 in. high. With the exception of a single break, where ten swivel jacks are located, the track is continuous. Special casters, known as "skates," are used to support the motor and the various parts are applied by teams of workmen. These jacks are used for turning the motor to any degree of the arc of a circle to permit assembly operations in inaccessible locations to be performed.

Heavy Headstock Hand Screw Machine

A new hand screw machine has been brought out by the Loisy-Patton Company, East Thirty-fifth Street and Perkins Avenue, Cleveland, Ohio. It is a standard machine of substantial construction with no important changes in the design as compared with the usual types of hand screw machines.

The headstock is very heavy to insure rigidity. The base of the headstock is dished out under the driving cone pulley and is provided with a narrow slot that extends through to the drip pan so that the oil which escapes from the bearings passes through into the drip pan instead of over the sides of the headstock. The capacity of the machine is 1 in. rounds, and it will turn stock up to 6 in. in length. The diameter of the automatic chuck plunger hole is 1 1-32 in., the diameter of the spindle hole is 1¼ in. and the diameter of the thread is 2⅜ in., with ⅛-in. pitch. The swing over bed is 14 in. and over the cut-off slide 6 in. The greatest distance from the end of the spindle to the face of the turret with saddle flush with the end of the bed is 14 in.



A Recent Hand Screw Machine Having an Exceptionally Heavy Headstock with a Dished Base to Provide for the Escape of Lubricant

The hexagon turret has face 7¼ in. in diameter. The turret has six 1-in. holes, which are 2⅜ in. above the top of the slide. The machine is driven through a three-step cone pulley, the steps being 6, 8 and 10 in. in diameter and the width of the belt is 3 in. The countershaft is of the double-friction type with pulleys 10 in. in diameter and 3½ in. wide.

Uranium in Tool Steel

The latest development in the tool steel industry appears to be the application of uranium as an alloy in varying quantities. In the accompanying table is shown a number of comparative tests of tools made from uranium high-speed steel as compared with regular high-speed steel. The tools marked U are uranium steel tools; those marked B, C and D are regular high-speed steels. The tests were made under the direction of the Standard Chemical Company, Pittsburgh, at the works of the Mesta Machine Company and other large users of tool steel.

All uranium tools were ½ x 1½ in., except No. 8-U, which was 1 x 2 in. The standard tools were all of larger sizes, the smallest being 1 x 2 in.

Comparative Tests of Uranium and Other High-Speed Steels

Tool	Feed, In.	Speed, Ft. Per Min.	Depth of Cut, In.	Remarks
Cutting 0.50 per cent-carbon 12-in. shaft:				
No. 1-U...	1/16	75	¼	Went over once distance of 14 in. On second lap went 3 in.
B	1/16	75	¼	Went distance of 4 in.
D	1/16	75	¼	Went distance of 1 in.
Cutting 8-in. shaft 7 ft. 5 in. long:				
No. 1-U...	1/16	51	⅝	Went over twice. Cut changed to ⅝ in. on second turn.
C	1/16	35	⅝	Did not go 1 in.
Cutting 6-in. shaft:				
No. 1-U...	1/32	75	⅝	Ran 18 in.
No. 2-U...	1/32	75	⅝	Ran 13 in. Speed increased to 90 ft. per min. and ran 11 in. Tool still good.
B	1/32	75	⅝	Ran 11 in.
Cutting 10-in. shaft:				
No. 4-U...	1/16	60 to 65	5/8	Went 8 in.
No. 2-U...	1/16	65	5/8	Went 4 in. Speed increased to 80 ft. per min. and went 3½ in.
No. 1-U...	3/64	55	5/16	Went 16 in.
B	3/64	55	5/16	Went 2½ in.
No. 5-U...	3/64	55	5/16	Went 15 in.
Cutting 12-in. shaft 22 ft. long:				
No. 8-U...	1/16	45	⅝ to ¾	Ran 87 in. Most of time the nose of the tool was right on scale.
Cutting 12-in. forging:				
No. 8-U...	1/16 to 1/10	38	15/16	Went 127 in. Time 3 hr. Speed increased to 65 ft. per min. after tool had gone 105 in.
No. 8-U...	1/16	60	1 1/16	Ran 12 in.

The annual meeting of the Savage Mountain Fire Brick Company, Frostburg, Md., also the directors' meeting, held April 8, resulted in the re-election of Charles C. Gorscuch, president; John A. Caldwell, vice-president and treasurer; W. F. Caldwell, secretary. The company is having a very successful year, but is far back in deliveries on orders.

The Great Western Smelting & Refining Company, Chicago, Ill., which has offices in several Western cities, has opened an office in the Woolworth Building, New York, which will be under the management of H. L. Green.

NO HEED TO MEN WHO KNOW

Scientific Shop Management Opposed for Labor Union Reasons

WASHINGTON, D. C., April 18, 1916.—Unless a member of the House Committee on Labor requests a special meeting of the committee to reconsider the vote taken on March 23 by which the Tavenner bill forbidding the employment of scientific shop management systems in the Government service was ordered to be favorably reported to the House, there will be no further action by the committee and the report urging the passage of the bill will be presented to the House in due time, probably within the coming week. This statement was made to the correspondent of THE IRON AGE by Representative Keating of Colorado, who has acted as chairman of the committee during the hearings on the Tavenner bill and who will draw the report. In this summary, not to say contemptuous, manner the committee dismisses the protests of the manufacturers and efficiency engineers presented at the recent hearings.

COMMITTEE IGNORANT OF THE FACTS

As reported in this correspondence last week, it was announced that the committee would meet on Thursday, April 13, to determine whether the action of the committee ordering a favorable report on the bill would be reconsidered in view of the testimony taken at the hearings. No meeting was held on Thursday, however, and it developed that no call had been issued. It was explained that the chairman has been absent from Washington much of the time of late, being engaged in an active canvass for the Maryland senatorship, and other members have had matters of more or less importance pending in other committees. The fact is that at no time during the recent hearings, when testimony of the highest importance was being given by experts of national reputation, was a quorum of the committee in attendance and much of the evidence was given in the presence of but two or three members of the committee.

Not only was the testimony presented to less than a quorum of the committee, but less than a quorum has even taken the trouble to examine the stenographic record of the hearings; hence it is a perfectly fair statement that on the official record the committee has reported to the House a bill concerning which it had little information and as to which those of its members who were present at the recent hearings displayed a most abject ignorance; that, in spite of the reasonable inference by those who were invited to address the committee that their statements would receive careful consideration, less than a majority of the committee have given them any consideration whatever, and that the opponents of the bill have been denied even the courtesy of a formal motion to reconsider the committee's adverse vote. It is quite clear that in granting hearings the active members of the committee had no thought of reconsidering the action taken, but for diplomatic reasons regarded it as inadvisable to refuse to hear the views of well-known manufacturers and engineers.

METAL TRADES PROTEST

The National Metal Trades Association has forwarded to the Labor Committee an urgent protest against the filing of a favorable report on the Tavenner bill until the subject can be further investigated. This protest, which is signed by Commissioner John D. Hibbard, is in part as follows:

The National Metal Trades Association is deeply interested in the principles involved in the Tavenner bill, believing that the entire country would be vitally affected should such proposed legislation be adopted. Regardless of sophistical argument, we all believe in efficiency. The Government is demanding greater efficiency, not only in operations of the various functions of the Government, but in the development of our national resources, the operations of our great transportation lines and the conduct of general business.

All over the country we are demanding a higher degree of technical skill in the management of State, county and municipal affairs, and until there is a more general intelligent knowledge of just what true efficiency contemplates, not only in the production of so many tons of material, but also with due regard to the human element—for "efficiency" certainly does consider this element—the National Metal Trades Association believes it would be of infinite menace and most unwise to adopt ill-considered and half-baked legislation. It is believed that action by the Government along these lines would be followed by attempts by State legislation to control private business, precisely in the same way in which such proposed State legislation followed the action of the Government regarding the eight-hour day. . . .

You would do well to visit a first-class shop working under such plans, or even the Government arsenals, before ill-advised legislation puts a stop to the work so well begun. I might even refer you to General Crozier's admirable statement as to the work in his department, for I can not think you have carefully read it or you would have a better idea of efficiency methods.

The use of the stop watch is not a method of measuring the time it takes each workman to do his task. In a large factory of several hundred men there may be but one stop watch. It is used to determine the amount of time spent in the various movements performed by workmen in the operations under study. . . . Now, without such studies, every workman will have his own standard, and perhaps set and grind his tools his own way. By the means of time studies it will be known which is the most efficient way to grind and set the tool for a given piece of work. That the workman himself benefits by such studies, into which he enters heartily when he correctly understands it, is obvious.

There is again the use of the watch to determine the best way for the workman to perform certain operations and to obtain a standard mark at which to shoot. On a premium basis every workman gets his full day's wages, and a bonus is paid in addition if the mark is reached or exceeded. The bonus is in proportion to the result, and is no different from a commission bonus to a salesman. The wages of the workman are his "drawing account" which is guaranteed.

The payment of bonus and premium is likewise a matter of advantage to the men, both in point of pay and in finding their proper work. It is only the stupid and slow who object to being paid according to their ability, if we except the opposition of the labor unions, which is based—as is unfortunately the whole idea of unionism—on the dead level of bringing the poor man up and the better man down. Until labor unions recede from this position which they really uphold, although theoretically deny, they will fail to reach the high place which they ought to have.

In fact, efficiency makes them healthy, happy, contented and prosperous workmen, and they are not only benefited individually but collectively, because greater production in the world lessens cost, increases buying power and real wages.

I trust that your committee may not favorably report out this bill until such time as a more exhaustive presentation of the case can be had. W. L. C.

The Combustion Engineering Corporation, manufacturer of stokers for boilers and industrial furnaces and grates for hand-fired boilers, 11 Broadway, New York City, has moved its offices from the thirteenth floor to the eighth floor in the same building. This is the third increase in the amount of office room within the last four years, the present offices being five times as large as those occupied in 1912. Offices have been opened in Cincinnati and Birmingham, Ala., and it is planned to open another at Atlanta, Ga., in the near future.

ESTABLISHED 1855

THE IRON AGE

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Economic Training of Congressmen

It has been assumed that industry has gained or is to gain by the changed attitude of the Administration in the past year, as expressed in part through the Federal Trade Commission. But there need be no delusion among manufacturers as to what they may expect when a Congressional committee comes to consider a bill affecting business. As between labor union leader and manufacturer, the average Congressman may be depended upon every time to give ear to the counsel of the labor leader. The attitude of the House Committee on Labor toward those manufacturers and engineers who attempted to get the truth about scientific shop management before that committee, as told in our Washington correspondence, is thoroughly typical. In spite of all the testimony of General Crozier and other Government representatives to the value of the Taylor system as employed in arsenals, the Committee on Labor fairly jumped at the conclusion that the Tavenner bill prohibiting the use of any such system should be reported favorably.

Men who knew of the excellent results obtained in private works, under a system of time study and of extra rewards to employees who accepted the help of the system, explained to the few members of the committee who could be induced to hear, how far from the fact was the information on which the Tavenner bill was based. It was shown that the makers of the bill had an altogether wrong idea about the use of the stop watch. It was also made plain that scientific management properly applied had not been opposed by employees, but was favored by many, since it opened the way to much higher wages without undue fatigue. But the members of Congress who had committed themselves to the labor unions in ignorance of the nature and results of scientific management had no idea of allowing their decision to be changed by any such thing as testimony to the facts. That the labor unions have been against any system that increased output without giving jobs for more men, even though the workmen made more money with less effort, was all that the average Congressman needed to know.

The hearing on the Tavenner bill—a hearing that the House Committee on Labor never intended to have—has demonstrated again that manufacturers need expect little from Congressmen if they are content forever to accept the rôle of the defensive in connection with legislative proposals. It is high time that some of the energies now applied to heading off backward-looking policies prompted by militant unions were directed to continuous propaganda to acquaint Congressmen with some of the basic facts of industrial economics.

War Dislocations in the Steel Industry

Apart from the large demand for steel caused in large part, directly or indirectly, by the war, there have been various striking dislocations. An advance in the past week of no less than four points in discount, or about $8 a ton, in welded steel boiler tubes, directs attention afresh to this item. There is no war demand for boiler tubes, but there has been a heavy war demand for certain classes of seamless steel tube material making the seamless tube plants so extremely busy that they cannot fill the demand for such boiler tubes, the condition resulting in an abnormal demand for welded boiler tubes. Since the low point in boiler tubes was reached somewhat more than a year ago, there have been seven advances of one point each, interspersed with four advances of two points each, while the present four-point advance makes a total of 19 points on the movement, or approximately $38 a ton. Meanwhile standard steel pipe has advanced only nine points or about $18 a ton. Including standard steel rails, which have just been advanced $5 a ton, the average advance in steel products, weighting each advance in proportion to the tonnage produced, has been, roughly speaking, about one cent a pound.

In the two prominent coated sheet steel products, tin plates and galvanized sheets, the war has had diametrically opposite effects. The demand for tin plate has been greatly augmented, while the demand for galvanized sheets has been very greatly reduced. There is no important demand for galvanized sheets for war purposes, but there has been such a demand for spelter as to make the cost of galvanized sheets relatively high. The comment is to be made, however, that if the advance in galvanized sheets had occurred lately, when all steel prices have been moving upward so rapidly, it might not have operated to reduce consumption as it did, for buyers are now more accustomed to sharp advances. As a matter of fact galvanized sheets are no higher priced today than in June, 1915, for a 5-cent level, which is also the present level, was attained in that month. Other steel products had advanced but very slightly

then, and black sheets were somewhat cheaper than at the beginning of the year. Thus the advance in galvanized sheets was conspicuous and probably operated to decrease consumption much more than if it had stood in company.

The manufacturers of galvanized sheets expect on the conclusion of the war to regain much if not all of the trade they have lost. In this they will be aided by cheap spelter, as there will be a large surplus producing capacity. As much of the spelter produced in recent years has been at no profit, however, there is no reason to expect the metal to sell at especially low prices, however great the excess in capacity. The Geological Survey has just issued its final figures on spelter in 1915, following the preliminary statement made in January, and from the extensive statement made the following figures, referring to tons of 2000 lb., are culled:

	1913	1914	1915
Production of primary spelter	346,676	353,049	489,519
Exports	21,269	75,368	131,383
Apparent consumption	295,370	299,125	364,382

The apparent consumption is computed by allowing for imports and exports and changes in stocks in bonded warehouses and at smelters. The 1913 production had been record, but the 1913 consumption was less than that in 1912, 340,341 tons. There is no doubt that while 1915 showed record high consumption the consumption in sheet galvanizing was very low, permitting a very large increase in spelter consumption in brass-making with but a small increase over the former maximum in total consumption.

There were 111,458 retorts for making spelter at the close of 1913, while at the end of 1915 there were 156,658, and with the completion of present plans there will be 206,270. Without going into details it appears that there will be a capacity to produce at least 900,000 tons annually of spelter, under normal conditions. The present output is not up to the capacity as figured for normal conditions, because many retorts are engaged in redistilling prime Western spelter, to produce an especially large tonnage of high grade spelter required for war purposes. Thus, the close of the war, by eliminating the requirement that a large proportion of the spelter be redistilled, will automatically and instantly effect what is equivalent to an increase in the capacity. And the capacity will be nearly three times what was needed to meet requirements before the war.

The remarkably heavy demand for tin plate, which has resulted in record production for a first quarter of the year, yet accompanied by a scarcity at a time of year when tin plate never before was scarce, may even be augmented in the next few months. While tin plate from South Wales has been scarce, resulting in very high prices and a large export demand upon the United States, the London *Iron and Coal Trades Review* now notes that the Ministry of Munitions has called for an increase of 75 per cent in the steel required for war purposes, an amount which is likely to come out of tin plate, eventually reducing the operation of the South Wales tin plate works to 50 per cent of their capacity. The statement is followed by the question whether there are war requirements in tin plate which the Government should consider when it makes these demands for steel from South Wales. Tin plate in the American market has already advanced a dollar a box. Since 1899 the greatest advance in tin plate had been 60 cents, but it required nearly two years to offset that advance, from $3.30 early in November, 1904, to $3.90 on Oct. 25, 1906.

The Advance in Rail Prices

Time was when an advance of $5 per ton on steel rails would have been a momentous occurrence. That was in the days when rails loomed up largely in the production of the country. As pointed out editorially in our last issue, rails are no longer among the principal products of our steel industry, but have of late years fallen into a comparatively minor position. In itself, an advance of $5 per ton is an important increment in price, but coming in a year when so many advances have been noted in iron and steel products it is simply another episode marking the general tendency of prices to seek higher levels.

In one respect, however, the advance in rails is almost an epoch. It is the first change in quotations of standard rails that has been made by the mills of this country since early in 1901. No other product in the history of the iron trade has ever maintained such an unbroken level, through good times and bad times, through booms and depressions, as steel rails have done for the past 14 years. Prior to 1901 rails moved sympathetically with other iron and steel products, rising when the demand was heavy and falling when this condition was reversed. The railroad companies were, however, always able to secure favorable consideration at the hands of the rail makers, due to the fact that they were such good customers, and prices of steel rails never advanced quite so high relatively as some other steel products; in fact, there have been times when, as is the case this year, steel billets have been much higher than rails. The rail makers and the railroads, in the course of time, came to consider $28 per gross ton, or 1¼c. per lb., as a fair price for standard Bessemer steel rails, and this grew into a tacit price for that product, without any agreement, and irrespective of prices of other iron and steel commodities. Consequently, since 1901 there has been no change in the standard price except that as open-hearth rails became a recognized product the price of such rails was established at $2 per ton above the price of Bessemer rails.

As this year has broken precedents and records in many other respects, it has for some time appeared inevitable that a new price would be placed on rails. The scarcity of steel has never been so great, and the demand for all kinds of finished steel products has been so heavy that the price of steel rails became far out of line with the prices realized for other steel commodities. As no exception was made with agricultural implement makers, who were compelled to pay high prices on contracts for steel bars for the coming manufacturing season, the probability grew that the railroads would not be accorded such exceedingly partial treatment as would have been the case if the price of rails had been continued at the old level.

The view appears to be taken in some quarters that the advance in rails means the inauguration of a new policy, and that hereafter prices of rails will be found to advance and decline in some harmony

with prices of other iron and steel products. We are not able of course to determine what may be in the minds of the rail makers, nor do we claim to have any gift of prophecy, but we do not believe that this will prove to be the case. In our opinion the advance just made has simply been a movement to place rails a little nearer to the prices being obtained on other iron and steel products, but not to indicate that if the scarcity of steel should continue prices may run much higher, or that when a depression prevails competition may bring rail prices down to something like those which were realized in the eighteen-nineties. The steel manufacturers of this country have learned much since those days. Moreover, the increasing severity of specifications has made rail business less desirable in comparison with other products, and that factor in the advance in price is likely to grow rather than diminish, whatever happens to the general steel market.

Losses on Defective Castings

The question has been raised whether makers of gray-iron castings should compensate the buyer for machine work put on a casting which proves faulty in the course of machining. It has been the general custom for the foundryman to replace castings in which defects sufficiently serious to warrant rejection are uncovered by machine shop operations. His liability, however, has ended there.

It should be said at once that if, in the present state of the foundry art, the foundryman is to be made liable for every loss due to defects which neither he nor others can determine at the time of inspection, it would be necessary to make a substantial advance in prices of castings to cover the increased hazard. Moreover, if the maker of castings is to undertake a broad guarantee, it might next be argued that the liability should be carried even further and cover the failure of a casting after it had become a component part of a machine, provided some fault was disclosed by the fracture. Absolute guarantees are not unknown in the trade, but, as in the case of a special insurance risk, prices are made high enough to cover all contingencies.

The question is largely one of competition. The average foundryman may be reassured by the fact that if a competitor is making unusual guarantees and is not receiving prices which cover the extra risk, such competitor is on unsafe ground. On the other hand, a foundryman might be quite safe in giving a broad guarantee provided the castings involved are simple and are not to be subjected to any great amount of machining or strain.

Competition is keen in the foundry trade, and it is not unnatural for founders to regard with apprehension any such suggestion as is here discussed, even though they realize that a foundry which undertakes wholesale guarantees on general work at competitive prices is surely courting trouble for itself. It is manifestly unfair to load all responsibility, proximate and ultimate, on the foundryman. It should be distributed according to the time-honored custom. The consumer's safeguard lies largely in the fact that foundrymen cannot afford to produce poor castings. Their reputation is at stake, and replacements minimize or destroy profits.

Developing South American Trade

J. R. McWane, president American Cast Iron Pipe Company, Birmingham, Ala., returned last week from a business tour of South America. His observations on methods of securing trade with countries in that part of the world are interesting and thoroughly practical. He is quoted as follows in the paily press:

"The business the United States will do in South America has not been exaggerated. The opportunity is there. The mistake of the American business man is that he has falsely magnified his opportunity to pick up the threads of business thought to have been broken and dropped at outbreak of the war. This business is not an emergency trade and is not to be quickly or easily secured. England and France, with advantage of better ship facilities and lower rates, because those countries are sending ships for grain and other provisions, are still furnishing necessities of life and business to their old trade in South America.

"We must learn to know those people, their temperament and their wants. No Eastern or Southern business man would attempt to develop trade in Western States without thorough preparation. Yet that has been America's attitude to what we thought was emergency business awaiting us. With no organization for getting the trade and no adequate shipping facilities if we secured it, we have expected to make that continent our commercial conquest.

"To develop business there will require a higher class of ability than in home trade. Our representatives must be business men, who will go among those people and live among them and learn their wants and ways. When we are in a position to more quickly and satisfactorily supply their needs, and extend the credits their trade conditions require, we may expect to profit from the vast resources of those countries. The big and the profitable business will come only after years of trading with them. Those who are not willing to pay in men and money and months of patient waiting had better stay out of it."

New Steelton Blast Furnace

The Pennsylvania Steel Company, recently acquired by the Bethlehem Steel Company, has awarded contracts for the erection of a 500-ton blast furnace at its Steelton, Pa., plant. The excavations and concrete work have been awarded to the Raymond Concrete Pile Company, New York, and the steel work to the Pennsylvania Engineering Works, New Castle, Pa. It is expected to have the furnace completed by Jan. 1, 1917. In the rechristening of the furnaces at Steelton this will be known as B stack. It will be the second of a group of five modern stacks which it is planned to have eventually at Steelton. No. 5 furnace, recently built by the old management, will be known as E stack and is the first unit of the new group. Nos. 4 and 3 stacks will be known as C and D respectively, and A stack, the eventual erection of which the new plans contemplate, will complete the group. Nos. 1 and 2 furnaces, which are somewhat separated from the proposed group, will be dismantled as the new units get under way. The work of remodeling No. 3 or D stack, started by the former management, has been halted. The new furnace will cost approximately $350,000.

A new steel merger and further expansion of steel and other plants are reported under consideration in Japan. The proposed capital is $50,000,000. A large shipyard is being established in conjunction with the Yokohama Dock Yard Company. The capital involved is about $1,750,000. The Pacific service, being now largely in the hands of Japanese steamship companies, their representatives have been in conference in Tokio to extend and insure the practical monopoly of the service now and after the war.

The Cornwall & Lebanon Railroad has placed 40 additional cars in service to carry ore from the Cornwall iron mines to the Lebanon, Pa., furnaces, recently acquired by the Bethlehem Steel Company.

Youngstown Sheet & Tube Company Buys Andrews & Hitchcock Iron Company

A deal was concluded April 12 at Youngstown, Ohio, by which the Youngstown Sheet & Tube Company bought the entire assets and assumed the liabilities of the Andrews & Hitchcock Iron Company, operating two modern blast furnaces at Hubbard, Ohio. One of these furnaces was entirely rebuilt in 1910, and the other last year. Both are in blast, one making foundry and the other basic iron. The Hubbard No. 2 Scotch iron made for years by the Andrews & Hitchcock Company enjoys a very high reputation and has always commanded the highest prices ruling. The two furnaces make about 800 tons of iron per day. Both are equipped with Mesta cross compound reversing engines, and are in splendid condition for a long run. Other assets of the company include a 12 per cent interest in the Mahoning ore mine and 1123 acres of undeveloped coal land in Greene County, Pa., limestone property, etc.

The capital stock of the Andrews & Hitchcock Iron Company was $400,000, divided into 400 shares of a par value of $100 each. However, this capital stock was purely nominal, as the purchaser paid between $2,000,000 and $2,500,000 for the property. The stock of the company was closely held by the heirs of C. H. Andrews and William J. Hitchcock, both deceased, and who were the founders of the company. The principal stockholders at present are Frank Hitchcock, who was president; Henry W. Heedy, who was secretary and treasurer, and Mrs. Louisa Andrews, Mrs. Leslie C. Bruce, Mrs. John A. Logan, Jr., and Mrs. Upson A. Andrews.

The Youngstown Sheet & Tube Company has taken possession of the property and will carry out all the contracts held by the Andrews & Hitchcock Company for pig iron, coke, etc. It will operate the two Hubbard furnaces for the present under the name of the Andrews & Hitchcock Iron Company. One stack is sold ahead for practically the remainder of this year on foundry iron, while the other has its output of basic sold up to June. The iron from the latter stack will be available for the Youngstown Sheet & Tube Company about July 1. It will probably be the policy of the company to operate one stack on basic iron for its own use, and continue the other on Hubbard Scotch iron for its regular customers.

The 12 per cent interest in the Mahoning Ore Company is a valuable asset as it has a lease that has yet to run 83 years on the Mahoning mine in the Mesaba range. The mine last year shipped 2,211,940 tons of ore. The Cambria Steel Company owns 50 per cent of this mine; Carnegie Steel Company, 20 per cent; Hanna interests, 12 per cent, and Republic Iron & Steel Company, 6 per cent. In addition to the acreage of coal land above referred to, the Youngstown Sheet & Tube Company has acquired 500 acres of surface rights for mine opening purposes.

This deal is important, not only from its size, but from the fact that it will likely remove the Youngstown Sheet & Tube Company from the market as a purchaser of basic and Bessemer iron. The company will now be one of the largest producers of pig iron in the country. It has four stacks at Youngstown, making about 2200 tons per day, and the 800 tons from the Andrews & Hitchcock furnaces will increase this to 3000 tons per day, giving the company a total output of 1,100,000 tons to 1,200,000 tons of pig iron per year. The Hubbard furnaces are located six or seven miles north of East Youngstown, and it is possible that within a year or two the Youngstown Sheet & Tube Company may build a railroad connecting the furnaces with its East Youngstown plant in order to use hot metal.

At a meeting of the new stockholders of the Andrews & Hitchcock Iron Company held in Youngstown, April 12, new officers were elected as follows: James A. Campbell, president; C. S. Robinson, vice-president; Richard Garlick, treasurer; W. J. Morris, assistant treasurer; Henry W. Heedy, secretary, and William Manning, assistant secretary. Henry W. Heedy, who was secretary and treasurer of the Andrews & Hitchcock Iron Company for many years, will in the future be connected with the sales department of the Youngstown Sheet & Tube Company.

President Campbell states that reports that the Youngstown Sheet & Tube Company would merge with the Inland Steel Company of Chicago, or would possibly take over that concern, are untrue. It is also denied that the Youngstown Sheet & Tube Company has secured a large acreage in the Chicago district with a lake frontage with the idea of building blast furnaces, a steel plant and finishing mills.

Morgan Engineering Company Acquires Canton Steel Foundry

In order to be self-contained the Morgan Engineering Company has just purchased the plant of the Canton Steel Foundry, Canton, Ohio. The latter has recently built an addition to its molding floor 65 ft. x 400 ft. The plant is served by eleven overhead traveling cranes. The foundry and yards take up a plot of fifteen acres, giving ample dumping ground for slag and other steel foundry refuse. There are two open-hearth steel furnaces, one of 25 tons and one of 35 tons capacity. The Morgan Engineering Company already has a large brass foundry, iron foundry, forge plant and a structural steel fabricating plant at Alliance. The purchase adds 500 men to its pay roll.

The Morgan Engineering Company has been modernizing and electrifying its machine tools and has just completed a large and well equipped erecting shop. There is a 100-ton crane on upper runways and on the lower runways one 40-ton, two 25-ton and one 10-ton. The shop is 95 ft. x 600 ft. and of steel and glass construction, with an additional connecting building 100 ft. x 200 ft. of the same general construction, to be used for brass machine shop, electrical shop and storerooms. The new buildings were completed in record time by the Samuel Austin & Son Company, Cleveland. By these changes the Morgan Company has been able to create three machine shops, respectively, 65 x 480 ft., 65 x 300 ft. and 78 x 275 ft. In addition it has doubled the drafting room size by the addition of a new building of all-steel and glass construction. The company is installing one of the largest planing machines in the world, made by the Niles-Bement-Pond Company and designed for the Creusot Works of France. It has also added a complete equipment of vertical and horizontal milling machines, drilling machines, etc.

New Steel Tubing Mill

The Ohio Steel Products Company, Mineral Ridge, Ohio, organized to manufacture high grade steel tubing, has acquired the plant of the Mineral Ridge Mfg. Company, which is now being remodeled, new equipment being installed. The oxy-acetylene process will be used in forming the tubing and a wide range of sizes will be made. The first installation will provide a capacity of 400,000 ft. per month, to be increased to 600,000 ft. as soon as the necessary equipment can be secured. A department for bending and forming exhaust pipes, etc., is being installed. After investigating several possible sites the company decided to locate in the Mahoning Valley on account of the near proximity to raw material. It is expected that the plant will be started May 15, and that it will be in full operation by June 1. A. G. Webb is president; L. H. Young, vice-president and treasurer; C. R. Phillips, secretary; S. A. Snell, general superintendent.

New Steel Plant at Peoria

The Keystone Steel & Wire Company, Peoria, Ill., is preparing plans for important additions. The proposed construction is to include two 75-ton open-hearth steel furnaces, a 35-in. blooming mill and a Morgan double-strand continuous rod mill.

The American Rolling Mill Company, Middletown, Ohio, is installing a new sheet mill at Middletown and another at its plant in Zanesville, Ohio. The company reports that all of its three plants are running on full time, with prospects for the future very bright.

STEEL CORPORATION AND LABOR

Comments by Judge Gary and an Employee at the Annual Meeting

Comments were made by Chairman E. H. Gary on labor conditions and an employee of one of the subsidiary companies appeared as proxy for other employee stockholders at the annual meeting of the United States Steel Corporation held at Hoboken, N. J., April 17. It was brought out that in March, when the books closed for the annual meeting, only 634,469 shares of common stock were held in foreign countries, or less than half the number of shares so held two years previous, which was 1,285,636. Of the preferred stock 312,832 shares were owned in foreign countries in March, 1914. In March of this year the foreign holdings of preferred stock were 262,091 shares. In the past year the total number of holders of common stock has been reduced from 56,825 to 41,910, and the number of holders of preferred stock from 85,912 to 85,332.

Commenting on business conditions in recent years and the relations of the corporation and its employees, Judge Gary said:

"You remember that from Oct. 1, 1913, until about a year ago, business conditions were very bad, perhaps never before in the history of the corporation were they so bad. Most of the independent steel makers reduced the wages of the common laborer, conditions probably forcing them to do so. The question came up whether the Steel Corporation should reduce the wages. After careful consideration it was decided to continue wages and pass the dividend on the common stock. In the case of the higher class of workers it was decided to reduce their wages, but the pay of the common laborers was maintained without interruption.

The Steel Corporation has reason to feel very well pleased with its employees. I think the officers have a great feeling of satisfaction over the conditions that have existed with the employees and with everything else. * * * It is not only to the pecuniary interest of the corporation to have employees who are satisfied, but it is also the satisfaction of the belief, at least, that the employee's rights have been respected and advanced. The welfare work, which is a big thing with our corporation, involving the lives, comfort and pleasure of the employees and their families, is, it seems to me, to be of great importance."

Introduced by Chairman Gary, Edwin R. Smith, a heater in the Canal Dover, Ohio, works of the American Sheet & Tin Plate Company, said that last year the corporation did not reduce wages until more than two months after the other steel companies had done so, and that the reduction applied only to tonnage men and did not affect common labor. He added:

"It is also noticeable that the Steel Corporation was the first to restore this 12½ per cent reduction in wages to these men, and in addition wages of the laborers were increased an average of 10 per cent. After restoring the deduction the company also left us on the equitable sliding wage scale which they inaugurated after wages had been reduced. * * * My observations lead me to conclude that the men are satisfied, regardless of what change may take place, that they will be properly cared for by those who are managing the Steel Corporation.

Judge Gary said that the corporation and its subsidiaries had in their employ at the present time about 250,000 men, of whom 50,000 are stockholders. In line with the plan of the corporation to reduce the board of directors from 18 to 15, the resignations of Edmund C. Converse, Alfred Clifford and Thomas Murray were accepted at the meeting. James A. Farrell, J. P. Morgan, Elbert H. Gary, George F. Baker and George W. Perkins were elected directors in the 1919 class.

The question whether or not four cylinders are enough for the automobile is to be discussed at an open meeting in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, on Thursday evening, April 20. The subject is to be introduced by papers by F. E. Watts, chief engineer Hupp Motor Car Company, and F. R. Porter, president Finley Robinson Porter Company. The meeting is to be held by the metropolitan sections of the Society of Automobile Engineers and the American Society of Mechanical Engineers.

Future War Orders for Steel

Edward R. Stettinius, head of the export department of J. P. Morgan & Co., returned to New York last week after an absence of two months in Europe. He said that the munition plants in England and France are running at high pressure and are producing tremendous quantities of munitions. This makes the French and English war departments relatively independent of the United States in the matter of munitions. "The rumors published here," said Mr. Stettinius, "that I am bringing over pockets full of new orders are not founded on fact. There are few new large orders for war materials coming to this country. Exports going out now are mainly the result of orders given a long time ago.

"Most of the reconstruction of the European countries now at war will be done by themselves when the war is ended. Many of the large factories which have sprung up for production of war munitions will be utilized for other purposes when the war is over. Many of the men returning from the front will have to be given employment and for this reason I do not anticipate any great influx of business to this country in what may be termed the reconstruction of the countries now at war."

The *Wall Street Journal* says: "The Stettinius interview to the effect that French and English war departments were relatively independent of United States in matter of munitions was not a disappointment to American manufacturers. They have realized right along that there would not be a duplication of the sensational orders of last year. Some orders for munitions are to be placed in this country, but they will go almost entirely to the companies experienced in that line, for example, Bethlehem and Midvale Steel. Companies that took war orders as a side line are not to be favored, according to a manufacturer in close touch with the situation. He said that as soon as present war orders on the books were worked off, he would begin the enlargement of regular lines of business."

New Rennerfelt Electric Steel Furnaces

Hamilton & Hansell, New York, announce four more Rennerfelt electric steel furnaces for this country. They are to be located as follows:

The Skagit Steel & Iron Works, Sedro-Woolley, Wash., will install a ¾-ton furnace for making steel castings.

The American Foundry & Machine Company, Salt Lake City, Utah, will install a 3-ton furnace for producing castings and ingots.

The Charleston Steel Company, Charleston, W. Va., will erect two 8-ton furnaces for making special steel ingots.

These four orders make seven Rennerfelt installations in the United States. In addition, the following have been ordered or installed in foreign countries since the review of the industry in THE IRON AGE, Jan. 6, 1916:

Svenska, Järnvägsverkstäderna Lenkoping, Sweden, will install one 1¼-ton furnace to make castings; Larsbo-Norn, Vikmanshyttan, Sweden, will install one 1¼-ton furnace for making tool steel; Hults, Bruk, Sweden, will install one ¾-ton furnace for making tool steel; Noes Järnverk, Tvedestrand, Norway, will make tool steel in a ½-ton furnace; Stchetinine, Petrograd, Russia, will make castings in two ¾-ton furnaces; William Beardmore & Co., Ltd., Forge, Scotland, will install one 3-ton furnace for making steel castings and special steels, and F. H. Lloyd & Co., Ltd., James Bridge Steel Works, near Wednesbury, England, will melt ferromanganese in a ⅛-ton furnace.

With the above, 54 Rennerfelt furnaces are now contracted for or in operation, and 21 of these are building. Of the total, 46 are for use in the steel industry.

The American Steel Export Company, which originated as the export department of the Cambria Steel Company, but which is now an independent company, has moved its main offices from Philadelphia to the thirtieth floor of the Woolworth Building, New York. H. W. McAteer, formerly comptroller of the Cambria Steel Company, is president, and C. B. McElhany, formerly general manager of sales of the Cambria Steel Company, is vice-president and general manager.

TEN PER CENT WAGE ADVANCE

Announcement by Three Important Companies at Youngstown, Ohio

On Saturday, April 15, the Youngstown Sheet & Tube Company, the Brier Hill Steel Company and the Republic Iron & Steel Company, all at Youngstown, Ohio, announced a straight advance in wages of 10 per cent of all employees, except those on salaries, effective May 1. The advance was entirely unsolicited and unexpected by the men, and will benefit about 9000 men employed by the Youngstown Sheet & Tube Company, 5000 or more by the Brier Hill Steel Company and about 7000 by the Republic Iron & Steel Company. J. A. Campbell, president of the Youngstown Sheet & Tube Company, said the advance was given to the men on account of the increased cost of living.

In its posted notice the Youngstown Sheet & Tube Company says that the advance is in lieu of profit sharing and that the 10 per cent will be paid in a separate check with the regular pay; also that it will continue through the year if present business conditions continue. A profit-sharing payment for the first four months of the year will be made at the year's end if warranted. The Republic company says that the extra payment will be continued as long as present prosperous conditions continue. The Brier Hill company simply announces the advance and adds that "the officers feel that present conditions justify the increase at this time."

Steel Corporation Makes an Advance

Chairman E. H. Gary gave out the following statement at New York on Tuesday, April 18: "In view of the continuance of prosperous conditions it has been decided to make advances in the wage rates of our iron and steel companies of about 10 per cent, to take effect May 1."

A Cleveland Advance

Corrigan, McKinney & Co., Cleveland, Ohio, announce a wage advance of 10 per cent, effective May 1, for the 1500 employees in their steel plant and at their Cleveland blast furnaces.

Car and Locomotive Orders

Orders for about 70 locomotives in the past week bring the total for the first two weeks of April to 150, of which 12 are for foreign countries. In March 453 were ordered. The Southern Railroad has ordered 25 Santa Fe and 15 mountain type locomotives from the Baldwin Locomotive Works. The American Locomotive Company will build 10 consolidated locomotives for the Pekin-Hankow Railroad of China and five switching locomotives for the Central Railroad of New Jersey, which road will also construct three of the same kind in its own shops.

More than six times as many locomotives and more than four times as many freight cars were ordered in the first quarter of 1916 as compared with the first quarter of 1915, according to the *Railway Age Gazette*. The comparison is as follows:

	Jan.-Mch., 1916	Jan.-Mch., 1915
Freight cars	38,169	8,943
Passenger cars	537	696
Locomotives	1,137	181

Orders for locomotives in April have been at nearly the rate shown above.

Corrigan, McKinney & Co., Cleveland, Ohio, placed their 21-in. continuous bar and billet mill in operation April 16. This firm now has its new steel plant in full operation with the exception of its 18-in. sheet-bar and billet mill. Its No. 3 blast furnace, in connection with the steel plant, is practically completed and will be blown in about May 1.

CONTENTS

SINTERING ORE AND FLUE DUST

Recent Patents Covering New Methods of Recovering the Iron

On a furnace for roasting and sintering ores in a continuous operation two patents have been granted to Franz Meyer of Uerdingen, Germany, and assigned to the Dwight & Lloyd Metallurgical Company of New York. The principle is similar to that used in the Dwight-Lloyd straight-line sintering machine, i.e., forming a layer of ore on a grate, igniting its surface and inducing a down-draft through the mass. In the new design the furnace consists of an annular grate rotatable about a central mast, the latter being hollow and communicating with the several grate compartments by radial conduits through which the gases of combustion are drawn off. The compartments beneath the grate surface are formed by annular plates dipping into a water seal and by cross-partition plates similarly dipping into a water seal.

The charge is fed continuously on the moving grate from a hopper. At a certain point the charge is ignited when passing under a source of heat. Combustion is sustained by drawing air downward through the charge as the grate revolves. The quantity of air thus drawn is regulated by spring valves in the conduits running from the grate compartments to the central mast, the spring valves, in turn, being actuated by traveling over an annular cam-track. The elevations in the cam-track can be so placed and of such magnitude as to regulate the draft, by allowing the valves to be open wide or practically closed. At the charging section of the grate the cams are so high that the valves are practically closed, and similarly at the point of discharge. The latter operation is effected by a plow scraping the sinter from the grates.

PROGRESSIVE COMBUSTION IN A COUNTER-CURRENT

Another invention in connection with agglomerating flue dust or fine ore provides for progressive combustion and a flow of air to support combustion in a direction counter to the flow of material. This counter current of air sweeps unsintered particles back into the combustion zone for further treatment. The sintering chamber is tubular, surrounded by a reverberatory chamber from which the heat comes. Air is drawn upward through the body of the material into an exhausting chamber from which it is drawn out through a pipe. The material is introduced by a screw and is distributed and leveled by a spreader and pusher. A revolving cone discharges and partly disintegrates the sinter coke, exposing any friable or untreated material to the current of air which carries it back to the fire zone. The patents are U. S. 1,166,903 and 1,166,904, Jan. 4, 1916, and were granted to Philip O. Harding of Pittsburgh.

MECHANICALLY HANDLED CAR COVER

It has been customary in sintering fine ore in pans to provide a removable cover with a burner mechanism but without mechanical means for handling it. A mechanism for raising or lowering the pan cover when the car has been run over the pan has been patented by Frank D. Carney and Richard V. McKay of Steelton, Pa. (U. S. 1,158,982). The cover is provided with a drop button which carries a sufficient charge to fill the pan when dumped and the bottom also acts as a leveler for the charge. The car carries an electric motor for controlling the mechanism. A charge of uniform compactness is secured.

BLAST-FURNACE SLAG AS A REDUCING AGENT

A novel method of recovering the iron from flue dust is found in a patent (U. S. 1,166,927, Jan. 4, 1916), granted to Samuel W. Osgood of Chicago. He proposes to mix the flue dust with water or a binder, such as lime or coal tar, and form pellets of desired size. He utilizes the heat and reducing gases of the blast-furnace slag to reduce the iron oxide contained in the flue dust to metallic iron by introducing the pellets into the molten slag as it leaves the furnace. By later granulating the slag the iron pellets can be recovered by screening, gravity separation or magnetic separation.

Spot-Welded Stellite Cutting Tools

The Haynes Stellite Company, Kokomo, Ind., is preparing to market a line of spot-welded tools made up of an ordinary steel bar to which is welded electrically a piece of stellite. For some time, particularly in some of the automobile plants of Detroit, bits of stellite have been spot welded and also butt welded to ordinary carbon steel bars, and as they mark an economical use of stellite, practically every particle of the stellite being utilized, the new tools are expected to have a broad market, particularly in view of the high price of high-speed steel.

Stellite, as will be remembered, is an alloy mainly of cobalt and chromium, discovered and patented by Elwood Haynes. It is claimed to have a capacity to cut metal at higher speeds than high-speed steel. Besides the spot-welded tools, the company also is making a stellite inlay tool. Into a special shape cavity in the ordinary steel bar, the stellite is cast. The melting point of stellite is higher than that of steel and the metals fuse together. The inlay becomes the cutting part of the composite tool.

The Haynes Stellite Company was organized on Nov. 1, 1915, and took over the patents of Elwood Haynes, who is president of the company. The present capacity is 5000 lb. of metal daily, and as the supply of the raw materials is no particular problem, the company expects to be able to make prompt shipments indefinitely. Stellite is sold at $5 per pound for two grades and $6 a pound for No. 3 grade.

Electrochemical Society's Annual Meeting

The annual meeting of the American Electrochemical Society will be held at Washington, D. C., April 27 to 29, 1916, at the headquarters, the New Willard Hotel. Some of the important papers are the following:

"Magnesium," by W. M. Grosvenor.
"Electric Furnace Products," by F. J. Tone.
"The Nitrogen Question," by W. S. Landis.
"The Brittleness of Annealed Copper," by W. E. Ruder.
"Faults of the Small Electric Arc Furnace," by W. M. McKnight.
"The Rennerfelt Electric Arc Furnace," by C. H. Von Baur.
"Corrosion and the Engineer," by W. H. Walker.
"Effect of Rust upon the Progress of Rust," by J. Aston.
"Electrolytic Zinc," by W. R. Ingalls.
"Recent Progress in Electrolytic Irons," by W. O. Storey.

An excursion to Mount Vernon on Friday afternoon, April 28, and a meeting on Saturday, April 29, at the Bureau of Standards will be features.

A New Detroit Blast Furnace

The Detroit Iron & Steel Company, Detroit, Mich., controlled by M. A. Hanna & Co., Cleveland, Ohio, will shortly place contracts for the erection of a third blast furnace at its Zug Island plant in Detroit. The plans call for a furnace somewhat larger than Nos. 1 and 2 and having a daily capacity of about 500 tons. This will be designed particularly for basic iron. The present stacks have a capacity of about 400 tons each. It is planned to have the new furnace in operation in about a year. M. A. Hanna & Co. will also rebuild their Dover furnace at Canal Dover, Ohio, making it a thin-lined stack. The contract for the rebuilding, including the engineering work, has been placed with Arthur G. McKee & Co., engineers, Cleveland. The present stack will remain in operation for about six weeks.

The Interstate Iron & Steel Company, Chicago, will place its new plant at Marion, Ohio, in operation about May 15. This is a rerolling mill for making hard steel bars and takes the place of one formerly operated by the company at Cambridge, Ohio, burned down several months ago.

Book Reviews

Galvanizing and Tinning. By W. T. Flanders, assisted by seven specialists. Pages, 350, 6 x 9 in.; illustrations, 134. Published by the David Williams Company, New York. Price, $3.

A series of articles on the methods of protecting iron and steel from corrosion, appearing in THE IRON AGE and in *Metal Worker* form the basis upon which this book has been built. The improvements which have taken place in practice since the articles were written, however, were of such importance as to warrant the rewriting of them and the inclusion of much additional information. In this work the assistance of a number of specialists was secured, with the result that a book has been prepared that is of inestimable value to the operator of a galvanizing or tinning plant.

The subjects of galvanizing and tinning divide themselves naturally into the several heads of equipment, cleaning, hot galvanizing, electro-galvanizing, sherardizing and tinning. This division of the subjects has been followed in the preparation of the book. The first few chapters consider the general subject of corrosion and its prevention, and the apparatus used in applying protective coatings by the hot galvanizing process. Then is taken up the question of preparing the castings for coating, which includes a discussion of the subjects of pickling, tumbling and sand blasting. Hot galvanizing forms the basis of five chapters, while seven chapters are devoted to tinning. Electro-galvanizing is covered in three chapters, and the subject of sherardizing requires no less than eight chapters for its treatment. Other chapter headings include: Galvanizing specifications and tests; the Schoop metal spray process; materials used in galvanizing; pyrometers.

The book is of an eminently practical character. It is so written that the user of galvanizing equipment can find in it the answer to practically every problem that may come to him. The information is presented in a usable form and it is not necessary to dig it out of a mass of useless verbiage. The subdivision of the material is so made that it is comparatively easy to find without trouble the exact paragraph pertaining to the subject upon which information may be required.

Lehrbuch der Eisen und Stahl Giesserei (Manual of the Iron and Steel Foundry), by Bernhard Osann, professor at the Koeniglichen Bergakademie in Clausthal. Pages 580, 6½ x 9½ in. Five plates and 675 illustrations. Price in paper covers, 19 marks; cloth bound, 20.20 marks. Published by Wilhelm Engelmann, Leipzig, Germany.

This book is a new and greatly enlarged edition of the same manual that was reviewed in THE IRON AGE Sept. 5, 1912, page 537. The number of pages has been increased from 497 to 580, and the number of illustrations from 526 to 675. This large number of clearly reproduced photographs and diagrams forms a very valuable part of the book and one that is directly available to a reader with little or no acquaintance with German.

All chapters seem to have been carefully gone over, and in many cases they have been rearranged as well as enlarged. This applies particularly to the sections on fuel, including oil firing; direct casting from the blast furnace; the use of briquetted turnings; segregation phenomena; molding machines, especially American types; the annealing of steel castings, and the use of metallography in practice. As mentioned in the previous review, the whole subject of iron foundry practice is covered in a very thorough manner, and there are important chapters on steel and malleable castings.

G. B. W.

A 64-page pamphlet, with as many more blank pages interleaved for making notes, was supplied as a detailed itinerary to the fourth-year students of electrical and mechanical engineering at the Ohio State University, for use on a seven-day inspection trip, April 13 to 20. The bulletin was noteworthy for the wealth of material covering products, processes and equipment of plants visited, and was a companion to a bulletin gotten up by Profs. W. T. Magruder and F. C. Caldwell two years ago on "Things to Be Observed and Noted on Inspection Trips."

A New Booklet on Safety

The Conference Board on Safety and Sanitation, composed of the National Founders' Association, the National Association of Manufacturers and the National Metal Trades' Association, has issued the first of a series of illustrated pamphlets intended to deal with fundamental features of safety and sanitation. The first number is devoted to "The Careless Habit," while the title of the little magazine is "The Spirit of Caution." The bulletins, if they follow the lines of the initial number, will be profusely illustrated in order to drive home the lessons which they aim to teach, and are sent to each member of the association comprising the conference board.

This safety and sanitation movement, it will be recalled, is conducted under the direction of Magnus W. Alexander, executive secretary of the board, West Lynn, Mass. The devices and methods developed are given tryouts before recommendation, and sometimes the devices have been manufactured for the board and sold by it at cost price to employers, whether members of the co-operating associations or not. Included in this group of safety devices are the N. A. S. O. safety goggles, arc welders' helmets, shoes for foundrymen, leggings for foundrymen, numerous danger signs of a portable nature, first aid jars, etc.

The apprentice system of the General Electric Company is described in an illustrated booklet issued by the Apprentice Department of the General Electric Company. The publication covers the qualifications of the applicants and the training courses for machinists, tool and die maker apprentices, pattern making apprentices, moulder apprentices, draftsman and electrical tester apprentices and technical clerk and cost accountant apprentices. The compensation paid is given and something is said about the social and recreational activities. A copy of the book can undoubtedly be had by addressing M. W. Alexander, West Lynn, Mass.

"The Testing of Hydrometers" is the subject of Circular No. 16 of the United States Bureau of Standards, the object of which is to present to manufacturers and others the information necessary to make possible the construction and verification of hydrometers on a uniform basis.

This Year's Copper Achievements

So spectacular are certain phases of the copper situation that the Boston *News Bureau* has compiled some highly interesting figures of probable output for the current year. It finds that if the present rate of output is maintained our refinery production for 1916 will for the first time exceed 2,000,000,000 lbs. The total is estimated at 2,096,875,000 lbs., an increase of 449,875,000 lbs. over 1915, or 27 per cent. Never before in the history of the industry has the increase in any one year exceeded 150,000,000 lbs. The copper producers would seem to be assured of a gross business this year of at least $524,000,000, and this assumes an average price of only 25c. per lb. If an average of 27c. is received, the producers stand to sell their product for $565,920,000. Such is the boon conferred by the European war. The full import of these figures is appreciated when placed beside gross values of $288,220,000 for the 1915 production and $205,066,000 for the 1914 period.

A Japanese commercial museum has been established in the Japanese settlement at Antung, China, so that actual exhibits of Japanese-manufactured goods could be seen by potential Chinese purchasers and where exhibits illustrative of the agricultural and mineral products of this district could be shown to prospective Japanese settlers and investors.

Iron and Steel Markets

FLURRY OVER WAR STEEL

Little More Available for This Year

Ten Per Cent War Bonuses to Labor—A $5 Rail Advance—Weakness in Coke

The uppermost concern of the week in steel and security markets has been the intimation of the leading buyer of munitions that the British and French war departments are now "relatively independent" of the United States in munitions supplies. The conclusion jumped at in some quarters of an early falling off in exports of war steel is far astray. Buyer's finesse is no new thing. It is quite well established that British contracts already closed, including a large one placed late in March with the Steel Corporation, call for practically all the shell and shrapnel steel this country can supply in 1917. Offers of further large amounts, chiefly for France and Italy, in the past two weeks have found mills unable to accept the business.

What France and Great Britain have done is chiefly to speed up the machining of shells, so that later there will be less dependence upon American machine shops. As for the steel itself, this country must still help out largely. The British order last week prohibiting general pig-iron and steel exports means more British steel for France and more call for American steel from neutral countries.

While the facts about recent war steel business are guarded to an unusual degree, it is known that some large inquiries have come from domestic companies having munitions contracts, also that a number of shell-forging contracts, which expire with June, carry options of renewal for a like amount.

It has been assumed that domestic consumers of steel have failed to get deliveries because foreign buyers were being taken care of, but facts are coming out of large shortages on export war contracts of leading producers, and foreign merchants are complaining of long delays in American shipments, which have cost them dear, as ocean freights have advanced.

Steel manufacturers have just announced wage advances of 10 per cent, forestalling the May turmoil, of which there are signs in various directions. Advances without any publicity have been made since the first of the year at a good many blast furnaces and rolling mills. The last advances are in many cases treated as bonuses, terminable when the war prosperity ends.

Rail mills announce an advance of $5 a ton or to $33 for Bessemer and $35 for open-hearth at mill. While leeway is given by some makers until May 1, in other cases the new price becomes effective at once. On rails for frogs and switches, heretofore bought at the established price, the advance is much more than $5. Light rails are very active, and another advance is expected shortly.

The Pennsylvania Railroad order for 205,000 tons of rails becomes the largest single contract on record because it calls mostly for 125-lb. rails, this road leading in the use of the heaviest sections on such a scale. The Great Northern has bought 30,000 tons of rails, the Wheeling & Lake Erie 15,000 tons, the Clover Leaf 5000 tons, and Southern roads 28,000 tons additional.

The particular price advance featured this week is $8 a ton on steel boiler tubes, with which is announced a $2 advance on steel and iron oil country goods. A Wheeling maker has put up prices on black steel pipe $2 and on galvanized $4 a ton.

While new contracting for further future delivery of bars, plates, shapes and sheets is less, there is no less stringency in prices, and week by week orders are placed for delivery in the second or third quarter at prices more than double those of 1915 contracts. Some filling-in contracts in plates have been closed with larger buyers at 3.50c., Pittsburgh, and on prompt plates 4c., 5c. and even 6c. has been paid.

The foundry pig-iron market has slowed down, but the facts are just coming out of some recent deals in steel-making pig iron in the Central West. One Youngstown buyer took about 60,000 tons of Bessemer iron, some of it at $21 at furnace and some slightly less. There was also a Youngstown purchase of 15,000 tons of basic at about $18 at furnace. The possibility of the Steel Corporation entering the market has come up again, in the event of some of its furnaces being forced out for relining.

Coke has developed notable weakness, and with prompt coke selling as low as $2 furnace companies have taken quite a different view of the contract basis for second half.

Pittsburgh

PITTSBURGH, PA., April 18, 1916.

Advances in prices during the week were confined to $8 per ton on steel boiler tubes and about the same on charcoal iron boiler tubes. Buyers are getting more and more imbued with the idea that nothing is to be gained at this time by placing orders for six or eight months ahead at present prices. This naturally means a falling off in the amount of new business being placed, but at the same time the demands on the mills for deliveries on contracts are as insistent as ever, and they are not catching up to any great extent. There is an active foreign inquiry for Bessemer iron, and there has been some fairly heavy buying of Bessemer and basic by two Youngstown interests. Semi-finished steel is quiet, but there are no signs of prices giving way. A decided slump in coke has occurred, due to heavy production and a better supply of cars. The scrap market is in a waiting attitude, large consumers being covered and out of the market. No indications appear of any easing in prices of finished steel, but as new demand is less the belief grows stronger that the crest of the wave in high prices has been reached.

Pig Iron.—An inquiry from Italy is in this market for 100,000 tons or more of Bessemer iron for shipment as soon as possible, but the scarcity of such iron prac-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	April 19, 1916.	April 12, 1916.	Mar. 22, 1916.	April 14, 1915.
Pig Iron. Per Gross Ton:				
No. 2 X, Philadelphia...	$20.50	$20.50	$20.00	$14.25
No. 2, Valley furnace...	18.50	18.50	18.50	12.75
No. 2, Southern, Cin'ti..	17.90	17.90	17.90	12.40
No. 2, Birmingham, Ala.	15.00	15.00	15.00	9.50
No. 2, furnace, Chicago*	19.00	19.00	19.00	13.00
Basic, del'd, eastern Pa.	20.50	20.50	19.50	13.25
Basic, Valley furnace...	*18.00*	18.25	18.25	12.50
Bessemer, Pittsburgh ..	21.95	21.95	21.95	14.55
Malleable Bess., Ch'go*.	19.50	19.50	19.50	13.00
Gray forge, Pittsburgh ..	18.70	18.70	18.45	13.45
L. S. charcoal, Chicago..	19.75	19.75	19.75	15.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	45.00	45.00	45.00	20.00
O.-h. billets, Pittsburgh..	45.00	45.00	45.00	20.00
O.-h. sheet bars, P'gh....	45.00	45.00	45.00	21.00
Forging billets, base, P'gh	**68.00**	67.50	65.00	25.00
O.-h. billets, Phila.....	50.00	50.00	50.00	21.52
Wire rods, Pittsburgh..	60.00	60.00	57.00	25.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	2.659	2.659	2.559	1.15
Iron bars, Pittsburgh....	2.50	2.50	2.40	1.20
Iron bars, Chicago.....	2.35	2.35	2.15	1.15
Steel bars, Pittsburgh...	**3.00**	2.75	2.75	1.20
Steel bars, New York...	**3.169**	2.919	2.919	1.369
Tank plates, Pittsburgh..	3.75	3.75	3.50	1.15
Tank plates, New York..	3.919	3.919	3.669	1.319
Beams, etc., Pittsburgh..	**2.60**	2.50	2.50	1.20
Beams, etc., New York..	2.769	2.769	2.619	1.369
Skelp, grooved steel, P'gh	2.35	2.35	2.30	1.12½
Skelp, sheared steel, P'gh	2.45	2.45	2.40	1.17½
Steel hoops, Pittsburgh..	3.00	3.00	3.00	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

	1916. April 19,	1916. April 13,	1916. Mar. 22,	1915. April 14,
Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	2.85	2.85	2.75	1.80
Galv. sheets, No. 28, P'gh	5.00	5.00	4.75	3.25
Wire nails, Pittsburgh...	2.40	2.40	2.40	1.55
Cut nails, Pittsburgh...	2.60	2.60	2.30	1.55
Fence wire, base, P'gh..	3.25	3.25	2.25	1.40
Barb wire, galv., P'gh..	3.25	3.25	3.25	2.10
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	18.00	18.00	18.00	11.75
Iron rails, Philadelphia..	20.00	20.00	20.00	13.00
Carwheels, Chicago.....	14.00	14.00	14.50	9.75
Carwheels, Philadelphia..	17.50	17.50	16.50	11.00
Heavy steel scrap, P'gh.	*17.75*	18.00	19.00	11.75
Heavy steel scrap, Phila.	18.00	18.00	17.00	11.00
Heavy steel scrap, Ch'go.	16.50	16.50	16.75	9.00
No. 1 cast, Pittsburgh..	16.00	16.00	16.25	12.00
No. 1 cast, Philadelphia.	18.00	18.00	17.00	12.00
No. 1 cast, Ch'go (net ton)	*12.75*	13.00	13.50	9.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt...	*$2.25*	$2.65	$3.50	$1.50
Furnace coke, future....	*2.50*	2.90	3.00	1.65
Foundry coke, prompt...	*3.50*	3.75	3.75	2.00
Foundry coke, future...	*3.25*	3.50	3.50	2.15
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	**28.75**	28.00	27.12½	17.75
Electrolytic copper, N. Y.	**28.50**	27.75	26.87½	16.37½
Spelter, St. Louis.....	**19.00**	18.75	17.75	9.75
Spelter, New York.....	**19.25**	19.00	18.00	9.87½
Lead, St. Louis.....	7.62½	7.87½	8.00	4.12½
Lead, New York.....	7.75	7.87½	8.00	4.20
Tin, New York.....	*51.00*	53.00	49.62½	57.00
Antimony, Asiatic, N. Y.	*41.00*	43.00	45.00	21.00
Tin plate, 100-lb. box, P'gh	$4.50	$4.50	$4.25	$3.25

tically prohibits sales based on shipments from Valley furnaces. The buyer agrees to accept any size shipments from 1000 tons up, but so far no part of the order has been taken by local or Valley interests. The Republic Iron & Steel Company has bought 15,000 tons of basic iron for delivery in the next three or four months at $18.50, delivered, equal to about $18 at furnace. The Youngstown Sheet & Tube Company has closed for a total of 60,000 tons of Bessemer, deliveries over the remainder of the year, at $21, Valley furnace, or slightly under that for some of the iron. The company will probably not be obliged to buy any more this year, as its purchase of the Hubbard furnaces will add so much to its pig-iron supply. Another sale of 6000 tons of standard Bessemer, to be delivered at the rate of 1500 tons per month, starting with May, has been made to a Pittsburgh consumer at $21, Valley furnace. Bessemer iron is now very firm on the basis of $21 to $21.50 at maker's furnace. It is said to be only a question of time until the Steel Corporation will have to buy both Bessemer and basic, and if it should come in the market it might clean up much of the Bessemer and basic that is available. Another local interest is said to be figuring on both Bessemer and basic, and may buy before the week is out. Not much is doing in foundry iron or in malleable Bessemer. We quote Bessemer iron at $21; basic, $18; gray forge, $17.75 to $18; malleable Bessemer, $18.50 to $19, and No. 2 foundry, $18.50 to $19, all at Valley furnace, the freight rate from furnace for delivery in the Pittsburgh or Cleveland district being 95c. per ton.

Billets and Sheet Bars.—There have been two or three fair sized sales of forging billets of ordinary carbon for delivery over the next three or four months at $68 to $69, f.o.b. Pittsburgh. The new demand for Bessemer and open-hearth billets and sheet bars is not very heavy, consumers evidently being covered. Deliveries of semi-finished steel by the mills are better now than for some time. Consumers of sheet bars who have sliding scale contracts are getting bars from several of the Youngstown mills on the basis of about $30 at mill. For delivery over the second and third quarters we quote: Bessemer billets, $45; open-hearth billets, $45; Bessemer sheet bars, $45, and open-hearth sheet bars, $45, maker's mill, Pittsburgh or Youngstown district. We quote forging billets at $68 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take $1 extra.

Steel Rails.—The order of the Pennsylvania Railroad was given out late last week and is for 205,000 tons of rails, all for 1917 delivery. The local and Chicago mills of the Steel Corporation are said to have taken between 100,000 and 115,000 tons of the order, the remainder being distributed among Cambria, Lackawanna, Bethlehem and Pennsylvania. The Wheeling & Lake Erie has placed 15,000 tons with the Carnegie Steel Company. The new demand for light rails is very active, running about 6000 tons or more per week. The advance of $5 per ton on standard section rails, effective May 1, means $33 for Bessemer rails and 1.56½c. per lb. for open-hearth. Another advance in prices of light rails is looked for in the next few days. We quote light rails as follows: 25 to 45 lb. sections, 2.10c.; 16 and 20 lb., 2.15c.; 12 and 14 lb., 2.20c., and 8 and 10 lb., 2.25c., in carloads and up to 100 tons. An advance of 5c. per 100 lb. is charged for less than carloads and down to 3 tons, while under 3 tons an additional 5c. is charged. We quote standard section rails of Bessemer stock at 1.25c. and of open-hearth steel, 1.34c., Pittsburgh.

Ferroalloys.—The situation as regards supply of ferromanganese is a trifle better, but it is believed this is only temporary. Several foreign cargoes have lately come into this country, but there is still a good deal of apprehension as to whether there will be enough of this alloy to meet the demand in two or three months from now. The American Manganese Mfg. Company started up its No. 2 furnace at Dunbar, Pa., last week on 20 per cent spiegeleisen, its No. 1 stack, which had been running for about a year on ferromanganese, having been blown out for relining and repairs. None of the importers will take contracts for English ferromanganese for delivery before 1917, and any hold-up in contracts for this year's delivery might result in some steel plants having to close down. There have been resales of a few carloads of foreign ferromanganese at $400 to $415 per ton. We quote 20 per cent spiegeleisen for forward delivery at $70 to $75 at furnace. Prices on 50 per cent ferrosilicon have not been changed, but the supply is inadequate to meet the demand promptly.

Ruling prices on 50 per cent ferrosilicon are $85 up to 100 tons; over 100 tons and up to 600 tons, $84, and over 600 tons, $83, all per gross ton, f.o.b. Pittsburgh. Prices of Bessemer ferrosilicon for delivery over remainder of the year are as follows: 9 per cent, $30; 10 per cent, $31; 11 per cent, $32; 12 per cent, $33; 13 per cent, $34.50; 14 per cent, $36.50; 15 per cent, $38.50, and 16 per cent, $41. Seven per cent silvery for the same delivery is $26.50; 8 per cent, $27; 9 per cent, $27.50; 10 per cent, $28; 11 per cent, $29, and 12 per cent, $30. All these prices are f.o.b. at furnace, Jackson, Ohio; New Straitsville, Ohio, or Ashland, Ky., each of these points having a freight rate or $2 per gross ton to Pittsburgh.

Structural Material.—The new demand is only fairly active, and it is evident a good deal of new work has been put off on account of the high prices. The American Bridge Company has taken 1000 tons for steel barges for the Mengel Box Company, Louisville, Ky.; 575 tons for an addition to the Gilsey House, Cleveland, Ohio; 325 tons for a national bank building in Elyria, Ohio; 300 tons for new buildings for J. B. Book, Detroit, Mich.; 1500 tons of bridge work for the Atlantic Coast Line, and about 550 tons of bridge work for the Pennsylvania Railroad. The Fort Pitt Bridge Works has taken 500 tons of bridge work for the Pennsylvania Lines West, and the McClintic-Marshall Company is reported to have 600 tons for additions for the Traylor Engineering Company, Allentown, Pa. We quote beams and channels up to 15 in. at 2.50c. to 2.75c. at mill, for delivery in third quarter and fourth quarter of this year. Small lots for prompt delivery from warehouse shapes are held at 3.25c. to 3.50c. and higher.

Plates.—Orders for cars are few in number and small in size. The Union Tank Line has increased its order for tank cars with the American Car & Foundry Company from 750 to 1000, the Erie has placed 500 steel gondolas with the Standard Steel Car Company, and the Pressed Steel Car Company has taken 20 steel ore cars for the Mount Union Refractories Company, 25 of the same type for the Solvay Process Company and 30 tunnel cars for the United Verde Copper Company. The Southern Railway is reported to have ordered 1750 wooden box cars from the American Car & Foundry Company and 1500 from the Mount Vernon Car Mfg. Company. We quote ¼-in. and heavier plates for delivery at convenience of the mill, which would be in four to six months, at 2.65c. to 2.75c., and for delivery in two to three months, 3.50c. to 3.75c., maker's mill. Small lots of plates for prompt shipment have sold at 4c. to 4.50c. at mill.

Sheets.—Reports of weakness in prices of light gage black sheets are not verified here, local makers stating the market is very strong on this grade and also on blue annealed, deep stamping and electrical sheets. On the latter grades local mills are sold up for practically the remainder of this year. On light gage black sheets some mills can promise deliveries in 12 to 14 weeks. There is still trouble in getting sheet bars promptly, and this is holding down the output to some extent. We quote Nos. 9 and 10 blue annealed sheets at 2.90c. to 3c.; No. 28 Bessemer black, 2.85c. to 2.90c.; open-hearth, 2.95c. to 3c.; No. 28 galvanized Bessemer stock, 4.90c. to 5c., and open-hearth, 5c. to 5.10c., most mills holding for the higher prices on both grades. We quote Nos. 22 and 24 black plate, tin mill sizes, H. R. and A., 2.70c.; Nos. 25, 26 and 27, 2.75c.; No. 28, 2.85c.; No. 29, 2.95c., and No. 30, 3c. These prices are for carload and larger lots, f.o.b. mill, Pittsburgh.

Tin Plate.—Current demand is quite heavy, and sales of tin plate for fairly prompt shipment from stock have been made at $5 per base box. Some contracts for export ranging from 2000 to 5000 boxes have been taken at $5 and over for delivery in the last two months of this year. Specifications against contracts received by the American Sheet & Tin Plate Company last week were the heaviest in any one week in its history. We now quote small lots from stock at $4.75 to $5 per base box, prices depending on sizes, quantity and deliveries wanted. We quote 14 x 20 coke plates at $4.50 per base box, and 8-lb. coated ternes at $7.50 for 200 lb., and $7.80 for 214 lb., all f.o.b. maker's mill, Pittsburgh.

Cold-Rolled Strip Steel.—Some contracts for 500 tons and more of cold-rolled strip steel have been placed in the past week for delivery in third quarter at $6 per 100 lb., base, and this is now the minimum price. On small lots for shipment at convenience of the mill from $7 to $8 and higher has been paid, one sale being reported at $8.80, base. One contract for 125 tons for third quarter was placed at $6.10. The standard extras now ruling were printed on page 810 in THE IRON AGE of March 30.

Rivets.—Makers report the new demand very urgent, and owing to inability to get steel promptly they are not catching up on deliveries but are getting further behind. There is an active demand from South America, India, France and other countries. Another advance in prices is looked for in the near future. We quote structural rivets, ½ in. and larger, at $3.25 per 100 lb., base, and conehead boiler rivets, $3.35, f.o.b. Pittsburgh, terms 30 days net, or one-half of 1 per cent off for cash in 10 days.

Skelp.—Local mills say they are practically sold up for the remainder of this year and prices are largely nominal. We quote grooved steel skelp at 2.35c. to 2.40c.; sheared steel skelp, 2.45c. to 2.50c.; grooved iron skelp, 2.70c. to 2.80c., and sheared iron skelp, 3c. to 3.10c., all delivered to consumers' mills in the Pittsburgh district.

Wire Products.—The trade is apprehensive of an early advance in prices on wire products and is placing orders quite freely, especially for nails. The fact that the demand for barb wire and fence wire this spring may not be as heavy as expected, owing to the high prices ruling, is not disturbing the mills, as they will divert the wire into other products for which there is a good demand and at high prices. On the more common sizes of wire nails premiums of 10c. over the regular base price of $2.40 per keg are being paid in some cases. Prices quoted by the mills to domestic consumers for delivery at convenience of the mill are as follows: Wire nails, $2.40; galvanized, 1 in. and longer, taking an advance over this price of $2, and shorter than 1 in., $2.50; plain annealed wire, $2.25; galvanized barb wire and fence staples, $3.25; painted barb wire, $2.55; polished fence staples, $2.55; cement coated nails, $2.40, base, all f.o.b. Pittsburgh, with freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven wire fencing are now 61½ per cent off list for carload lots; 60½ per cent for 1000-rod lots and 59½ per cent for small lots, f.o.b. Pittsburgh.

Nuts and Bolts.—The market continues very active, and with the inability of makers to get steel promptly their output is restricted a good deal and they are unable to catch up on deliveries. Export demand is strong, but little is being done on account of the railroad embargo. Some makers are consigning nuts and bolts to customers in New York, and they in turn are reconsigned for export when a boat is available. The embargo to New England points is practically removed, and shipments to that territory are now going forward. Discounts, which are stated to be for prompt acceptance only, are as follows, delivered in lots of 300 lb. or more where the actual freight rate does not exceed 20c. per 100 lb.

Machine bolts, h. p. nuts, small, rolled thread, 60, 10 and 5 per cent; small, cut thread, 60 and 10; large, 50 and 10.

Machine bolts, c. p. c. and t. nuts, small, 60 per cent; large, 45.

Carriage bolts, small, rolled thread, 60 and 10 per cent; small, cut thread, 60 and 5; large, 50.

Blank bolts, 50 and 10 per cent. Bolt ends, h. p. nuts, 50 and 10; with c. p. nuts, 45. Rough stud bolts, 30. Lag screws (cone or gimlet point), 65. Forged set screws and tap bolts, 25 per cent.

Nuts, tapped or blank, h. p. square, $3.25 off; h. p. hex., $3.25 off; c. p. c. & t. sq. nuts, tapped or blank, $3.50 off; c. p. c. & t. hex., $3.50 off. Semi-finished hex. nuts, 70, 10 and 10 per cent; finished and case hardened nuts, 70 and 10.

Rivets, 7/16 in. in diameter and smaller, 60.

Wire Rods.—Local makers say they have no rods to sell in the open market and are discouraging new inquiries, especially for export. Several sales of fairly good-sized lots of open-hearth rods for shipment at convenience of the mill are reported at $60 per ton at mill.

We quote Bessemer, open-hearth and chain rods, at nominally $60 at mill.

Railroad Spikes.—Inquiry is more active. The Baltimore & Ohio Railroad is in the market for 15,000 to 20,000 kegs and the Chesapeake & Ohio and Norfolk & Western each for 9000 kegs. Other roads are expected to come in the market soon. Some of these orders will probably run for delivery into next year. We quote:

Standard railroad spikes, 4½ x 9/16 in. and larger, $2.65 to $2.75; railroad spikes, ½ and 7/16 in., $2.75 base; railroad spikes, ⅜ in. and 5/16 in., $3.05 base; boat spikes, $2.80 base, all per 100 lb., f.o.b. Pittsburgh.

Shafting.—Some sales of shafting for fairly prompt shipment have been made at the base price of 5c. per lb., but very little is available. Makers state they are filled up with orders on all they can turn out in the next five or six months, but are taking some contracts for delivery in last quarter at 20 per cent off. The output of shafting this year and the prices obtained will break all records. Specifications from the automobile and screw stock machine trades are very heavy, and are also coming in actively now from the implement makers. We quote cold-rolled shafting at 20 per cent off in carloads and 15 per cent in less than carloads, f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars.—Mills that have their output of steel bars sold up for the remainder of this year are not actively quoting, while other makers are still naming 2.50c. to 2.75c. for delivery in last quarter. Some contracts from the implement trade for delivery in last half of the year were placed lately at slightly under 2.50c. Some heavy inquiries for steel rounds for export have been in this market for several weeks, but local mills are passing them up, their obligations preventing them from making the deliveries wanted. The new demand for iron bars is also very active, and mills are sold up for three or four months ahead, with specifications coming in very freely. We quote steel bars at 2.50c. to 2.75c. for delivery in third and fourth quarters, and 3c. to 3.25c. for delivery in second quarter. From warehouse stock 3.25c. and up to 3.50c. is quoted. We quote common iron bars at 2.50c. to 2.60c., and railroad test bars at 2.60c. to 2.70c. at mill.

Hoops and Bands.—For prompt delivery steel hoops have sold at 3c. and steel bands at 2.75c. to 3c., with a very limited amount available. Prices for delivery at convenience of the mill are about 2.75c. for hoops and 2.60c. to 2.75c. for steel bands.

Merchant Steel.—Any prices quoted are purely nominal and for delivery at convenience of the mill, which might be in five to six months. The mills have their output sold up into fourth quarter, and specifications against contracts are heavy. The scarcity in supply of steel is restricting output to some extent. On small lots for delivery at convenience of the mill, which would be in four to six months or longer, prices are about as follows: Iron finished tire, ½ x 1½ in. and larger, 2.35c., base; under ½ x 1½ in., 2.50c.; planished tire, 2.55c.; channel tire, ¾ to ⅞ and 1 in., 2.85c. to 2.95c.; 1⅛ in. and larger, 3.25c.; toe calk, 2.95c. to 3.05c., base; flat sleigh shoe, 2.70c.; concave and convex, 2.75c.; cutter shoe, tapered or bent, 3.25c. to 3.35c.; spring steel, 2.95c. to 3.05c.; machinery steel, smooth finish, 2.75c.

Carwheels.—No carwheels for delivery this year can be obtained from local makers on new contracts. The addition to the Schoen steel wheel plant of the Carnegie Steel Company, which will about double its capacity, will be ready before long. We quote 33-in. freight carwheels in lots of 1000 or more at $18; 33-in. tender wheels, $22; 36-in. passenger or tender wheels, $26. These prices are based on a 10-in. diameter hub, 50c. extra being charged for 11-in., all f.o.b. Pittsburgh.

Wrought Pipe.—An advance of $2 per ton on steel and iron oil country goods was made April 15, and, effective from Monday, April 17, the Wheeling Steel & Iron Company, Wheeling, W. Va., lowered discounts on black steel pipe one point, an advance of $2, and on galvanized two points, an advance of $4 a ton. The company also advanced oil country goods and line pipe $2 per ton, effective from the same date. As yet none of the other pipe mills has advanced prices, but may do so within a day or two. The demand for iron and steel pipe is enormously heavy, orders entered by the mills so far this year being more than double what they were at this time last year. No large inquiries for oil or gas lines are out, but it is said the pipe mills are not anxious for these so long as they can sell their output in the smaller sizes of pipe. Discounts in effect at this writing are given on a forward page.

Boiler Tubes.—Effective Saturday, April 15, discounts on steel boiler tubes were lowered four points, an advance of $8 per ton, and makers of charcoal iron tubes also lowered discounts from three to six points, discounts on these now being about eight points lower than on steel tubes. One large Eastern maker reports it is sold up for eight months and is obtaining higher prices than are quoted by one or two local makers. On locomotive and merchant tubes local mills are practically sold up for the remainder of this year, and the same is true of iron tubes. The new discounts effective from April 15 on iron and steel boiler tubes are given elsewhere in this issue.

Coke.—A very serious slump has occurred in both prompt and contract furnace coke, with the demand very light. Best grades of blast-furnace coke for spot shipment have been offered as low as $2.25, and buyers contemplating placing contracts for furnace coke for last half seem to be scared off. The output of coke for the past two or three weeks has been very heavy and, with suspensions of shipments by some of the furnaces, there has been an accumulation which has affected the market. Coke makers say they are not anxious to close for last half under present conditions, and are satisfied to hold off, believing that prices will react. Late last week there were sales of sixty to seventy cars of high-grade furnace coke sold for prompt shipment at about $2.40 per net ton, but this price could not be obtained to-day. Prices on foundry coke are also weaker, but not to the same extent as furnace coke. We now quote best grades of furnace coke for prompt shipment at $2.25 to $2.35 per net ton at oven and on contracts about $2.50 for shipment over last half of the year. We quote best grades of 72-hr. foundry coke at $3.25 to $3.50 for prompt shipment and from $3.25 to $3.50 on contracts. The Connellsville *Courier* gives the output of coke in the upper and lower Connellsville regions for the week ended April 1 as 465,664 net tons, a decrease from the previous week of 31,331 tons.

Old Material.—Large consumers are covered and out of the market. There is no great amount of scrap pressing the market to find sale, and if a large consumer would come in for a good sized amount of steel scrap he would probably have to pay $18 or better. There is still some buying of borings and turnings for use in blast furnaces, sales having been made last week at $11 to $11.25, delivered, for both grades. The embargo on scrap routed for the Cambria Steel Company is still on, but is expected to be removed shortly. Quotations on heavy steel scrap are 25c. per ton lower, and sales have been made by dealers to each other at $17.60 or lower per gross ton. Dealers quote for delivery in the Pittsburgh and near-by districts that take the same rates of freight, as follows, per gross ton:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered	$17.75 to $18.00
No. 1 foundry cast	16.00 to 16.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	18.00 to 18.25
Hydraulic compressed sheet scrap	16.00 to 16.25
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	14.25 to 14.50
Bundled sheet stamping scrap	13.00 to 13.25
No. 1 railroad malleable stock	15.50 to 16.00
Railroad grate bars	13.00 to 13.25
Low phosphorus melting stock	20.50 to 21.00
Iron car axles	26.50 to 27.00
Steel car axles	26.00 to 26.50
Locomotive axles, steel	29.00 to 29.50
No. 1 busheling scrap	16.00 to 16.25
Machine-shop turnings	10.75 to 11.00
Old carwheels	16.00 to 16.25
Cast-iron borings	11.00 to 11.25
*Sheet bar crop ends	18.00 to 18.50
No. 1 railroad wrought scrap	19.00 to 19.50
Heavy steel axle turnings	14.00 to 14.50
Heavy breakable cast scrap	15.00 to 15.25

*Shipping point.

Chicago

CHICAGO, ILL., April 19, 1916.—(*By Wire.*)

Buying activity is clearly subsiding. The demand for nearly every kind of product, while still insistent in specific cases, is less general. An exception is the purchase of rails for the Pennsylvania Lines, which is notable both as the largest single purchase of rails ever made and for the weight of the rail section, which will be 130 pounds for almost the entire tonnage. About 40,000 tons of the order will be rolled at Chicago. The Great Northern also has bought 30,000 tons. In connection with structural steel, the limitations of buying are perhaps more clearly defined than in any other direction, and such contracts as have been recently closed are restricted to bridges and railroad and mill building requirements to the exclusion of general building projects. The buying of plates is less a feature, although the extremities of the situation as to supply are indicated by recent prices, as high as 4c., Chicago. With reference to sheets, the past week has brought a better demand for some grades that were for a time noticeably inactive. The last half purchases of bolts by the implement interests are still to be made. The pig-iron market has not yet awakened from the lull which followed the heavy buying of March. The quietness, however, has in it no suggestion of weakness except as the Southern market is affected by the continued appearance of resale iron at prices below furnace quotations. The tendency of scrap prices is still downward.

Pig Iron.—The willingness of some of the Southern furnaces which have been asking $16 for last half iron to return again to the basis of $15.50 suggests that there is less of strength in their situation than had been supposed. The advance in the prices of Southern iron based on large sales appears less sound as the extent of the speculative buying which occasioned those sales becomes more apparent in the reappearance of this iron on the present market at prices considerably below furnace quotations. Sales of high silicon Southern iron at Chicago last week were at a concession of at least 50c. per ton. The Northern iron situation is more sound and prices are above the average in uniformity. With one exception, stocks on furnace yards have practically disappeared and shipments are going forward at a rate which for the most part continuously absorbs the daily production. With sales for the last half made in March, reported as approximating 200,000 tons, the firm attitude of the furnaces in respect of last half iron appears warranted. The possibility of a second merchant stack being diverted to the manufacture of ferromanganese and the expected blowing out of one Iroquois and one Bayview furnace add strength to the producers' position, with special bearing on the prompt shipment market. For prompt shipment the present large production of the furnaces provides enough iron to supply readily the now moderate demand. The heavy contracting since the middle of February has undoubtedly resulted in the ample covering of the consuming needs of the district. A sale of 5000 tons of basic to a southern Illinois steel maker has been made by a Chicago furnace at a price under $19. For Lake Superior charcoal iron we quote delivery prices at Chicago to include a freight rate of $1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$19.75
Lake Superior charcoal, No. 1	20.25
Lake Superior charcoal, No. 6 and Scotch	20.75
Northern coke foundry, No. 1	19.50
Northern coke foundry, No. 2	19.00
Northern coke foundry, No. 3	18.50
Southern coke, No. 1 f'dry and 1 soft	$19.50 to 20.00
Southern coke, No. 2 f'dry and 2 soft	19.00 to 19.50
Malleable Bessemer	19.50
Basic	19.00
Low phosphorus	34.00 to 36.00
Silvery, 8 per cent	29.50
Bessemer ferrosilicon, 10 per cent	33.50

(*By Mail*)

Rails and Track Supplies.—Of the Pennsylvania Railroad contracts for 205,000 tons of rails, about 40,000 tons will be rolled at Chicago, almost entirely of 130-lb. section. The Great Northern has placed orders for 30,000 tons for 1917 delivery, of which 15,000 tons are to be rolled at Chicago, 10,000 tons go to the Lackawanna Steel Company and 5000 tons to the Bethlehem Steel Company. The mills have also taken further large orders for track fastenings. In accordance with the announcement of an advance of $5 per ton in the price of standard section rails, effective May 1, we have revised our quotations as follows: Standard railroad spikes, 2.75c., base; track bolts with square nuts, 3.25c. to 3.50c., base, all in carload lots, Chicago; tieplates, $50, f.o.b. mill, net ton; standard section, Bessemer rails, Chicago, 1.25c. to 1.47½c., base; open hearth, 1.34c. to 1.56½c.; light rails, 25 to 45 lb., 1.70c.; 16 to 20 lb., 1.75c.; 12 lb., 1.80c.; 8 lb., 1.85c.; angle bars, 1.50c. to 1.75c., Chicago.

Structural Material.—Except for such adjustments of rolling schedules as may permit the accommodation of fabricators who have pressing need of material not provided for in their regular contract quotas, the local mill situation admits of practically no new business in structural steel. The scarcity of new structural projects evidences the general acceptance of these conditions as well as the fact that on the basis of present prices few such undertakings are feasible. The American Bridge Company will supply 1060 tons for a highway bridge at Seattle and 208 tons for a mine of the Oliver Iron & Mining Company at Ironwood, Mich. The Minneapolis Steel & Machinery Company will fabricate the 1625 tons of steel for the new ore dock of the Soo Line at Ashland, Wis., and the Lakeside Bridge & Iron Works, 500 tons for the new machine shop of the Yates Machine Company (formerly Berlin Machine Works), Beloit, Wis. Car inquiry is limited to the quiet negotiations of one railroad for 1000 to 1500 cars. We quote for Chicago delivery of plain material from mill 2.639c.

We quote for Chicago delivery of structural steel from jobbers' stocks 3.10c.

Plates.—While there does not seem to be so general an inquiry for plates, particularly for prompt shipment, such demand as has appeared is decidedly imperative, and as high as 4c., Chicago, has been paid for deliveries within 90 days. The mills also report inquiry for plates for last half delivery, which, for the most part, they were unable to satisfy. A mill which up to two weeks ago could offer plates for four weeks' shipment now has no more to sell for any delivery for which it is willing to quote. Another mill selling into this territory has been taking business for the second quarter at 3.50c., Pittsburgh, as compared with contracts for the same period taken two months ago at 3.25c. We quote for Chicago delivery of plates from mill for contracts 2.939c. and for prompt shipment 3.50c.

We quote for Chicago delivery of plates out of stock 3.50c.

Sheets.—Highly finished sheets and blue annealed in the heavier gages continue to be greatly in demand. There is inquiry also for galvanized sheets in small quantities, but contract shipments appear to be meeting most of the needs of the trade, and the selling for early delivery is not of much consequence. There is a better demand for black sheets, and prices are now quoted with little variation at a minimum of 2.90c., Pittsburgh. We quote for Chicago delivery, blue annealed, No. 16 and heavier, 3.089c. to 3.189c.; box annealed, No. 17 and higher, 3.089c. to 3.189c.; No. 28 galvanized, 4.939c. to 5.189c.

We quote for Chicago delivery of plates out of stock 3.50c. mum prices applying on bundles of 25 or more, as follows: No. 10 blue annealed, 3.40c.; No. 28 black, 3.10c. to 3.20c.; No. 28 galvanized, 5.40c. to 5.50c.

Bars.—Some few contracts for bar iron for the full last half period have been taken by the mills but for the most part they are not selling beyond 60 days. For as far in the future as they care to commit themselves there is more business offering than can be cared for. For the second quarter the price is 2.35c. and last half contracts have been booked at 2.50c. The demand for high-carbon bars has put the mills in a very strong position and higher quotations represented by a spread from 2.50c. to 2.75c., are the rule. We quote mill ship-

ments, Chicago, as follows: Bar iron, minimum, 2.35c.; soft steel bars, 2.639c.; hard steel bars, 2.50c. to 2.75c.; shafting, in carloads, 30 per cent off; less than carloads, 25 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 3.10c.; bar iron, 3.10c.; reinforcing bars, 3.10c., base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 15 per cent off.

Rivets and Bolts.—Inquiry from the implement interests for last half bolt contracts have been very generally received by the bolt makers but the closing of this business is still deferred. Some of the bolt works are still lacking definite assurance as to their steel supply for the last half and offer this as a reason for the postponing of contracting. The difference in the price of rivets, at Chicago, from mill or out of stock, is so small that the general manufacturing trade is largely meeting its requirements from store. We quote as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 60-10; cut thread, 60-5; larger sizes, 50; machine bolts up to ⅞ x 4 in., rolled thread, with hot pressed square nuts, 60-10-5; cut thread, 60-10; larger sizes, 50-10; gimlet point coach screws, 65; hot pressed nuts, square, $3.25 off per 100 lb.; hexagon, $3.25 off. Structural rivets, ¾ to 1¼ in., 3.30c. to 3.40c., base, Chicago, in carload lots, boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ⅞ x 4 in., 65-5; larger sizes, 65; carriage bolts up to ¾ x 6 in., 65; larger sizes, 50-15 off; hot pressed nuts, square, $3.70, and hexagon, $3.80 off per 100 lb., lag screws, 65-10-5.

Old Material.—Except for the few specialties to which the unusual conditions have given extraordinary values, as iron and steel axles, arch bars and locomotive tires, the scrap market shows very little strength or activity. A small amount of No. 2 wrought and machine shop turnings has been taken by consumers and there is a filling of orders for steel scrap for delivery at Gary, but for the principal grades there is a marked lack of demand from consumers. The mill at Indiana Harbor is temporarily stopping shipments owing to congestion at its works, largely resulting from the confusion of new construction in progress. Railroad offerings of scrap for the week are not large, the only list of size being that of the Illinois Central amounting to 5000 tons, the largest item of which is 2000 tons of carwheels. The Chicago Great Western and the Omaha line each have 1000 tons, the Monon 600 tons, the Soo Line 500 tons and the Grand Trunk 1250. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$18.00 to $18.50
Relaying rails	19.50 to 20.50
Old carwheels	14.00 to 14.50
Old steel rails, rerolling	18.00 to 18.25
Old steel rails, less than 3 ft	19.00 to 19.50
Heavy melting steel scrap	16.50 to 17.00
Frogs, switches and guards, cut apart	16.50 to 17.00
Shoveling steel	16.00 to 16.25
Steel axle turnings	11.75 to 12.25

Per Net Ton

Iron angles and splice bars	$18.50 to $19.00
Iron arch bars and transoms	19.75 to 20.25
Steel angle bars	15.75 to 16.00
Iron car axles	24.00 to 24.50
Steel car axles	26.50 to 27.00
No. 1 railroad wrought	17.00 to 17.50
No. 2 railroad wrought	15.75 to 16.00
Cut forge	15.75 to 16.25
No. 1 busheling	13.75 to 14.25
No. 2 busheling	10.00 to 10.50
Pipes and flues	12.50 to 12.75
Steel knuckles and couplers	15.50 to 16.00
Steel springs	16.00 to 16.50
No. 1 boilers, cut to sheets and rings	12.25 to 12.50
Boiler punchings	14.00 to 14.50
Locomotive tires, smooth	18.75 to 19.25
Machine shop turnings	7.50 to 7.75
Cast borings	7.00 to 7.50
No. 1 cast scrap	12.75 to 13.25
Stove plate and light cast scrap	10.75 to 11.25
Grate bars	11.00 to 11.25
Brake shoes	11.25 to 11.50
Railroad malleable	13.75 to 14.25
Agricultural malleable	11.25 to 11.75

Wire Products.—The mills are so far behind in their deliveries that the rate at which sales are being made is of little consequence. It is noticeable, however, that new business from the jobbing trade is somewhat reduced and a more conservative buying attitude has begun to appear. Although no further advance in prices has been announced, some of the mills are selling for early shipment at an advance of $2 per ton. We continue to quote to jobbers as follows: Plain wire, No. 8 and coarser, base, $2.439; wire nails, $2.589; painted barb wire, $2.739; galvanized barb wire, $3.439; polished staples, $2.739; galvanized staples, $3.439, all Chicago.

Cast-Iron Pipe.—The only municipal pipe work of size likely to be placed in the coming week is 1400 tons for Highland Park, a suburb of Detroit. A number of small jobs are up for figures but in the aggregate not more than 600 tons will be required. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $33.50 to $34; 6 in. and larger, $30.50 to $31, with $1 extra for class A water pipe and gas pipe.

Philadelphia

PHILADELPHIA, PA., April 18, 1916.

Little if any change is to be discerned in finished steel products, either as to prices or demand. The railroads are eager for material, and a leading road cheerfully paid the high figure asked for plates. A leading maker not only has sufficient orders to carry him through the year, but sees that some of them must run into 1917. He has not taken any business for next year's delivery with the exception of contracts for ship plates. Several hundred tons of plates for June and July shipment to Canada were taken at 4c., Pittsburgh. A few sales of fair-sized quantities of pig iron have been made, most of the activity being in charcoal and low phosphorus, but the general trend of the market has been quiet. Nearly all furnaces are producing faster than they are shipping, and at the moment it cannot be said that there is any shortage of iron. Ferroalloys are unchanged, except that Bessemer ferrosilicon has been advanced. Coke is easier, largely because of the better freight conditions. In foundry coke there has been active buying. The old material market shows an easier tendency, partly because of freer offerings, and also because the recent large buying at Pittsburgh, which caused a stronger market here, is losing some of its influence. The local market is a waiting one.

Iron Ore.—Arrivals of foreign ore at this port in the week ended April 15 consisted of 16,600 tons from Cuba and 7209 tons from Sweden.

Pig Iron.—A quiet, steady business has been done. The Baldwin Locomotive Works is reported to have closed for the 1000 to 1500 tons of low silicon iron and 2000 to 3000 tons of high silicon for third quarter delivery for which inquiry was made a week ago. The business is understood to have gone to Buffalo furnaces. The Pennsylvania Railroad is inquiring for 600 tons of high manganese and 700 tons of charcoal iron, third quarter delivery. In the latter grade there has been considerable activity of late, about 3500 tons having been taken in various lots at prices ranging from $20.84, Buffalo, upward, according to grade, taking a freight rate of $2.58 for delivery here. One maker of eastern Pennsylvania No. 2 X will not consider an order for that grade under $20.50, furnace, or $21.29, Philadelphia, while other makers will accept less. The statement has been made that pig iron has been oversold. At the present time, in this district and practically all others, production is running ahead of shipments. The orders booked are heavy in the aggregate, but the orders are mostly for iron yet to be made, and some sellers take more account of stocks and shipments than they do of orders for future delivery. The greater part of recent buying was for last half delivery. While most of the steel mills are well supplied with basic, one having a surplus which it would be willing to sell at a price over the market, not every mill is so comfortably situated, and some business has resulted from this cause. A small enterprise on the Delaware River, recently reorganized, is reported to be in the market for about 1000 tons. Standard low phosphorus maintains its strong tendency, a conservative quotation being $34 to $35, Philadelphia. A New England consumer recently took

6000 tons. Lebanon low phosphorus is unchanged at $30 to $32, furnace. Quotations for standard brands, delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa., No. 2 X foundry	$20.50 to $21.00
Eastern Pa., No. 2 plain	20.25 to 20.75
Virginia, No. 2 X foundry	21.25
Virginia, No. 2 plain	20.75
Gray forge	19.00 to 19.50
Basic	20.50 to 21.00
Standard low phosphorus	34.00

Ferroalloys.—Little or no change is reported in the situation with regard to 80 per cent ferromanganese. Limited quantities are available at $175, seaboard, for the first half, and $200 for the last quarter. Ferromanganese is not affected by the recent order issued by Great Britain forbidding the exportation of various iron and steel products from the United Kingdom. Some interests are asking $80 for prompt spiegeleisen containing about 18 to 20 per cent manganese. For 30 per cent spiegel $100 has been quoted. No transactions in prompt 80 per cent ferromanganese are reported, but the quotation continues around $400 per ton. Bessemer ferrosilicon is higher at $36.44, Philadelphia, for 10 per cent, and $37.44 for 11 per cent. Contract ferrosilicon, 50 per cent, is unchanged at $83 to $85, Pittsburgh.

Plates.—The situation is as strong as ever, and mill representatives report that the railroads are hungry for material, and in cases have met the high prices without a murmur. Eastern Pennsylvania mills quote 3.75c., Philadelphia, for forward delivery, while buyers wanting prompt material pay premiums without hesitation. With the orders they have booked, the mills have their hands full in caring for their regular customers as they desire to do. Some of their orders are bound to run over into 1917. For 600 tons of plates in large sizes, made to conform to Lloyd's specifications, 4c. was paid, delivery to be in June and July, for a Canadian consumer.

Bars.—The situation is unrelieved and steel bars continue nominal at 2.909c., Philadelphia. Iron bars are strong at 2.659c., Philadelphia. The inquiry for shell rounds represents a big tonnage wanted for last-half delivery for both domestic and foreign delivery, the quotations for which range from 4.25c. to 4.50c.

Structural Material.—The demand for shapes continues active, and the quotation of eastern Pennsylvania mills is strong at 3.159c., Philadelphia. Small propositions predominate in this district, but there are a goodly number of these. The bridge shops are busy, but some could take on a little more work.

Billets.—A small lot of Bessemer billets was purchased in the past week at the equivalent of $44.50, Philadelphia. Open-hearth re-rolling billets are quoted at $50 to $55, and forging steel at $65.

Sheets.—The quotation for No. 10 blue annealed is unchanged at 3.909c. to 4.159c., Philadelphia.

Old Material.—The market is again a waiting one, but is a little easier because of the freer offerings. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania, and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$18.00 to $18.50
Old steel rails, rerolling	19.00 to 20.00
Low phos. heavy melting steel scrap	22.50 to 23.25
Old steel axles	26.00 to 27.00
Old iron axles	28.00 to 29.00
Old iron rails	20.00 to 20.50
Old carwheels	17.50 to 18.00
No. 1 railroad wrought	23.50 to 24.50
Wrought-iron pipe	15.00 to 15.50
No. 1 forge fire	15.50 to 16.00
Bundled sheets	15.00 to 16.00
No. 2 busheling	11.00 to 11.50
Machine shop turnings	11.00 to 11.50
Cast borings	11.50 to 12.00
No. 1 cast	18.00 to 18.50
Grate bars, railroad	14.00 to 14.50
Stove plate	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Coke.—Foundry coke has been active at prices ranging from $3.60 to $3.75 per net ton at oven for contract, and about $4 for spot. Furnace coke is lower at about $2.50 for spot and $2.75 to $3 for contract. Freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Cincinnati

CINCINNATI, OHIO, April 19, 1916.—(*By Wire.*)

Pig Iron.—Ohio silvery irons have been advanced $2 per ton, or to $29 at furnace, based on an 8 per cent analysis, by two makers, and other producers are expected to follow suit at a very early date. Quite a number of small orders for high silicon irons were booked before prices advanced, mainly for shipment this year. The price situation on foundry iron in the South is unchanged, and $15, Birmingham basis, is the generally accepted quotation for shipment to July 1, but $15.50 is asked for last half business. As far as can be ascertained, $16 for the first half of next year is inserted in contracts for that delivery, although a few furnaces are asking $16.50. Southern Ohio furnaces are quoting $10, Ironton, for this year's shipment, and while a premium is asked for delivery in the first half of 1917 this same figure is said to be acceptable on desirable business. Both basic and malleable are quoted at the same price as No. 2 foundry, but no orders of consequence for either have lately been placed. Order books show only a few sales made last week, included in which are two 500-ton lots of Northern foundry iron for northern and central Ohio consumers. A southern Ohio consumer took 500 tons of Southern iron, and 800 tons was booked for a Kentucky firm. A Michigan melter took 600 tons of Lake Superior charcoal for shipment in the first half of next year. The general inquiry continues light, the largest one out being for 2000 tons of Northern foundry iron for first half delivery for a central Ohio melter. Another user in the same territory is asking for a round quantity of both Northern and Southern grades. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	$18.40 to $18.90
Southern coke, No. 2 f'dry and 2 soft.	17.90 to 18.40
Southern coke, No. 3 foundry	17.40 to 17.90
Southern No. 4 foundry	16.90 to 17.40
Southern gray forge	16.40 to 16.90
Ohio silvery, 8 per cent silicon	28.26 to 28.76
Southern Ohio coke, No. 1	21.26
Southern Ohio coke, No. 2	20.26
Southern Ohio coke, No. 3	19.76
Southern Ohio malleable Bessemer	20.26
Basic, Northern	20.26
Lake Superior charcoal	21.20 to 22.20
Standard Southern carwheel	25.40 to 25.90

(*By Mail*)

Coke.—The majority of foundrymen have covered for future requirements, and those who have not done so appear content to postpone purchases until nearer the expiration time of their old contracts. Spot shipment coke is now quoted around the same figures as contract. We quote Connellsville 48-hr. coke for either prompt or future shipment at from $2.50 to $3 per net ton at oven and 72-hr. coke around $3.50 to $3.75. Wise County and Pocahontas prices are about the same, with the possible exception of some brands of foundry coke that are held a few cents a ton higher on contract business. New River foundry coke is unchanged at $4 to $4.50 per net ton at oven.

Finished Material.—Cold rolled rounds have been advanced again and the local store quotation to-day is 20 per cent plus the list. Even further advances are anticipated. Local jobbers have recently filled some urgent orders from the Pittsburgh district, although their available stocks are limited. Orders for reinforcing concrete bars are very good, although the warehouse quotation is now firm at 3.35c. Plain steel bars are quoted at 3.20c.; No. 10 blue annealed sheets, 3.50c.; plates, 3.50c.; small structural shapes, 3.20c.; wire nails, $2.65 per keg, base, and barb wire, $3.50 per 100 lb. The mill price of No. 28 galvanized sheets is around 5.15c. to 5.20c., Cincinnati or Newport, Ky., and on No. 28 black sheets from 3.15c. to 3.25c., with indications of further advances at an early date. High-speed steel is still on the up grade, with several leading brands quoted at $3.25 to $3.75 per lb., although some steels are available at lower figures.

Old Material.—The market is not so firm at it was two weeks ago. The supply of scrap of all kinds is now in excess of the demand. Although shipments are going forward at a rapid rate, inbound shipments tend to increase yard stocks. Practically all grades have been reduced 25c. per ton. The minimum figures given below represent what dealers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$12.75 to $13.25
Old iron rails	16.75 to 17.25
Relaying rails, 50 lb. and up	22.00 to 22.50
Rerolling steel rails	15.75 to 16.25
Heavy melting steel scrap	15.00 to 15.50
Steel rails for melting	14.25 to 14.75

Per Net Ton

No. 1 railroad wrought	$14.25 to $14.75
Cast borings	6.50 to 7.00
Steel turnings	6.50 to 7.00
Railroad cast scrap	12.00 to 12.50
No. 1 machinery scrap	13.75 to 14.25
Burnt scrap	8.75 to 9.25
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	17.50 to 18.00
Pipes and flues	10.50 to 11.00
Malleable and steel scrap	11.75 to 12.25
Railroad tank and sheet scrap	9.50 to 10.00

Cleveland

CLEVELAND, OHIO, April 18, 1916.

Iron Ore.—Navigation has opened on the Lakes and the first cargo will be shipped from Escanaba within a day or two. The ice was broken up with an ice crusher in Escanaba harbor and at the docks yesterday, and the first boat is at the docks ready for loading. A number of ore boats are on their way up for cargoes. The ice is still solid at the Soo and it will be close to May 1 before navigation is open at the head of the Lakes. We quote ore prices as follows, delivered at lower Lake ports: Old range Bessemer, $4.45; Mesaba Bessemer, $4.20; old range non-Bessemer, $3.20; Mesaba non-Bessemer, $3.55.

Pig Iron.—The market is quiet. Most foundries are under contract for last half and few want to contract at the present time for next year's requirements. Foundries that have covered for the first half of next year are for the most part engaged in automobile work, and they have taken contracts for castings for that delivery. The Cleveland minimum price has been advanced to $19.30 for No. 2, delivered, one Cleveland interest having marked its price up from $19 this week, but this seller is still quoting foundry iron for outside shipment at $18.50. The only sale of any size reported is 1150 tons taken by a Massillon consumer for last half. Southern iron is generally quoted at $15.50 for the remainder of the year and $16 for the first half of next year. A few sales for next year at $16 are reported. However, Southern iron for early shipment is not firm and some can be had at $15. Ohio silvery iron has been advanced $2 a ton to $29 for 8 per cent. This price is being quoted for the first half of next year. We quote, delivered Cleveland, as follows:

Bessemer	$21.95 to $22.45
Basic	19.20 to 19.30
Northern No. 2 foundry	19.30 to 19.50
Southern No. 2 foundry	19.00 to 19.50
Gray forge	18.75
Jackson Co. silvery, 8 per cent silicon	30.62
Standard low phos., Valley furnace	32.00

Coke.—With most foundries covered the market is quiet, although a few additional contracts are reported. Furnace coke for prompt shipment is very weak, and some Connellsville furnace coke on cars has been offered at less than $2 per ton, although the usual quotation is about $2.25. We quote standard Connellsville foundry coke at $3.50 per net ton at oven for contracts for the year, $3.50 and $3.75 for last half, and $3.75 and $4 for prompt shipment.

Finished Iron and Steel.—New inquiries have fallen off considerably. Most consumers have orders on the mill books to meet their requirements for an extended period, and are crowding mills for deliveries. The demand from the automobile manufacturers and railroads is very heavy. The high cost of building is curtailing small building work, and the demand for steel bars for reinforcing purposes has fallen off. The Clover Leaf Railroad has placed 5000 tons of rails for 1917 delivery with the leading interest, which will take no additional rail orders except at the $5-a-ton advance in price. In connection with the advance in rails, the price to makers of frogs and switches has been advanced materially beyond the new figure because of the relatively small miscellaneous character of the purchases by these consumers. In the past these consumers have been able to place contracts at the same prices as the railroads. The proposed building of four Lake freight boats, for which there was an inquiry out recently, has been dropped for the present. Plate prices quoted by Cleveland mills are firm and unchanged at 3.25c. to 4c., Pittsburgh. Some hard steel bars have been sold in this market at 2.25c., Moline, Ill., or 2.47c., delivered; but this price has been advanced to 2.40c. Bar iron is quoted at 2.40c. to 2.50c., Pittsburgh. Several Ohio sheet mills are being seriously hampered by the slow deliveries of sheet bars, causing a curtailing of the production, and some mills are entirely out of the market or have nothing to offer in some lines. Prices are firm, and some sales are reported at higher than regular quotations. Sales of black sheets have been made as high as 3.25c., for No. 28. We quote black sheets at 2.90c. to 3c., Ohio mill, for No. 28; blue annealed at 3c. to 3.10c. for No 10, and galvanized at 5c. to 5.30c. for No. 28. Warehouse business is heavy, with prices unchanged at 3.25c. for steel bars and structural material, 3.65c. for plates, 3.50c. for blue annealed sheets and 3.20c. for iron bars.

Bolts, Nuts and Rivets.—Bolt and nut prices will probably be advanced 10 to 20 per cent this week and books will be opened for contracts for delivery after July 1. Wire mills are now taking contracts for basic and Bessemer bolt stock at 2.45c., Pittsburgh, for third quarter delivery, or an advance of $4 per ton over present prices, so that bolt and nut makers need not hold off any longer in taking contracts for delivery after July 1. The demand for bolts and nuts continues very active, and that for rivets is heavy. Prices are unchanged at 3.25c., Pittsburgh, for structural and 3.35c. for boiler rivets for carload lots for second quarter delivery, with an advance of $3 per ton for the third quarter. Bolt and nut discounts are as follows:

Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 60 and 10; cut thread, 60 and 5; larger or longer, 50; machine bolts with h. p. nuts, ⅜ x 4 in., smaller and shorter, rolled thread, 60, 10 and 5; cut thread, 60 and 10; larger and longer, 50 and 10; lag bolts, gimlet or cone point, 65; square h. p. nuts, blank or tapped, $3.25 off the list; hexagon, h. p. nuts, blank or tapped, $3.25 off; c. p. c. and t. square nuts, blank or tapped, $3 off; hexagon nuts, all sizes, $3.50 off; cold pressed semi-finished hexagon nuts, all sizes, 70, 10 and 10 off.

Old Material.—The market is inactive and weak. A great deal of scrap is being offered and no mills are actively in the market. Scrap is coming in on old contracts much faster than it is being consumed, and most of the mills are crowded with material. As purchases have been light during the past few weeks, dealers look for a buying movement before long. However, there is a feeling that before this buying starts prices may go somewhat lower. A local mill has taken 500 tons of heavy melting steel at $17.50, which appears to be somewhat above the usual Cleveland quotation. Borings are about 25c. a ton lower and turnings are weaker. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Old steel rails	$17.00 to $17.50
Old iron rails	19.00
Steel car axles	26.00
Heavy melting steel	17.00 to 17.25
Old carwheels	14.00 to 14.50
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	14.25 to 14.75
Railroad malleable	17.00 to 17.50
Steel axle turnings	13.25 to 13.50
Light bundled sheet scrap	14.00 to 14.25

Per Net Ton

Iron car axles	$23.00 to $24.00
Cast borings	8.00 to 8.25
Iron and steel turnings and drillings	8.00 to 8.10
No. 1 busheling	14.00 to 14.50
No. 1 railroad wrought	17.50 to 18.00
No. 1 cast	14.25 to 14.75
Railroad grate bars	11.75 to 12.00
Stove plate	11.75 to 12.00

Birmingham

BIRMINGHAM, ALA., April 17, 1916.

Pig Iron.—Quiet market conditions are the natural outcome of heavy purchases in March, liberal supplies on hand by large consumers and stability of the price situation, which presages no early advance. The market is firm around $15 and $15.50, minimums for spot and forward deliveries, with some undercutting of the latter figure by furnaces situated nearer the competitive field than those of the Birmingham district. Spot brings $15.50 in many instances. The inquiry is not brisk. One maker has sold his output, but as a rule there has been comparatively small buying. As an instance of the frequently observed level of spot and forward deliveries may be adduced a sale of 800 tons at $15.50, of which half was for second and half for third quarter. A car of high silicon sold for $17. There was perhaps some disappointment that the recent visit to the district of the head of the leading pipe interest was not in connection with new buying. The pipe, radiator and harvester interests are supplied with a large quantity of iron on yards purchased some time ago and held in warrant for consumption as needed. It cannot be forecasted when the big buyers will reappear, a fact which tends to prevent advances. The leading interest is not cutting much figure in the foundry market, but it names the minimum as its quotations, and that fixes the schedule. A larger amount than usual of special analysis iron is being turned out by Alabama stacks, and is finding a ready market around $16.50 to $17. The special Clifton brand, which commands as high as $18 to $18.50, is not on the market for the time being. The car supply has improved and there has been little complaint of shortage in iron circles recently. The advance in rails has stimulated inquiry and presages the maximum amount of basic metal output after July 1, which, however, will be compensated for by additional stacks going in. An inquiry for a round lot of charcoal iron for 1917 has been received. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$15.50 to $16.00
No. 2 foundry and soft	15.00 to 15.50
No. 3 foundry	14.50 to 15.00
No. 4 foundry	14.25 to 14.75
Gray forge	14.00 to 14.50
Basic	15.00 to 15.50
Charcoal	22.50 to 23.00

Cast-Iron Pipe.—Water and gas pipe factories are enjoying a good business, with order books well filled. Latin-American pipe contracts, both in water and soil pipe, have been booked by Birmingham makers, but delivery difficulties are experienced. The labor troubles in the Anniston soil pipe district continue, and have spread to the ordnance factory. We quote per net ton, f.o.b. pipe shop yards, as follows: 4-in., $28; 6-in. and upward, $25, with $1 added for gas pipe.

Old Material.—The scrap market is quite active. There have been large shipments of steel scrap to mills in the Middle West. Steel shafting and rounds have been bringing $18 to $18.50. One or two minor changes have been made in quotations based upon actual selling. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old steel axles	$18.00 to $19.00
Old steel rails	13.00 to 13.50
No. 1 steel scrap	11.00 to 11.50
No. 1 wrought scrap	13.00 to 13.50
No. 1 cast scrap	11.25 to 11.75
Heavy cast scrap	10.50 to 11.00
Stoveplate and light	9.75 to 10.25
Old carwheels	12.00 to 12.50
Tram carwheels	10.25 to 10.75

Coal and Coke.—Coke is again higher, and the supply falls far short of the demand. Brookwood has advanced to the flat price of $4.50 per net ton, f.o.b oven, and Yolande hand-picked brings that price and something over. The advance is $1 per ton over prices prevailing three months ago. Furnace coke may be had at $3 to $3.50 per ton, but there is little available. The movement has improved, owing to a more liberal supply of cars. Steam coal is slow. Blacksmithing coal, however, has advanced, and is now selling at $2.25 f.o.b. mines, as compared with $1.75 three months ago. John H. Adams, of Birmingham; D. E. Mitchell, of Lebanon, Tenn., and others, have organized the Birmingham District Mining & Mfg. Company with extensive coal holdings.

San Francisco

SAN FRANCISCO, CAL., April 11, 1916.

Contracting for distant delivery is not so much in evidence as a few weeks ago, but the demand for current consumption in ordinary trade channels is steadily broadening, the jobbing movement being exceptionally active. The inquiry for material for special construction also holds up fairly well, while orders for early delivery are placed with increasing difficulty. Export business is curtailed both by scarcity of material and lack of shipping facilities, though there is a strong foreign demand in many lines.

Bars.—Local mills report continued demands from the Orient, but cannot get steamer space to carry the merchandise that would otherwise move in that direction. The local market, however, is readily absorbing everything available, and it is hard to get any large quantity for early delivery. Requirements of implement and miscellaneous manufacturers, as well as of small consumers, are larger than usual, and many inquiries are appearing for reinforcing bars. Mills are asking about 3.60c. for second quarter delivery.

Structural Material.—Notwithstanding the tendency to delay work on some classes of buildings, fabricating contracts involving quite a substantial tonnage are being closed, and several important jobs are expected in the near future. Figures will be taken shortly for a large county bridge in San Luis, Obispo County, Cal. Plans are out for a theater at Ellis and Mason streets, about 200 tons, and an inquiry is expected soon for a six-story apartment at Bush and Mason streets. The Western Iron Works has a small fabricating contract on Beale Street, and the Ralston Iron Works is fabricating about 150 tons for a building at Ellis and Hyde streets. Business interests in the Bay cities are giving serious consideration to plans for a bridge between San Francisco and Oakland, but no early action is expected. Fabricators are still short of plain material, and the volume going to miscellaneous industries is above normal. Plans are under way for the Southern Pacific Company's ten-story office building.

Plates.—Merchants are specifying heavily, and find it impossible to keep any satisfactory assortment in stock. Shipbuilders are not gettting material fast enough for their needs, and are keeping the market closely cleaned up of wide sizes. Some of the oil interests have recently bought up all offerings of certain sizes of tank plates. Demands from the smaller shops also continue heavy, and deliveries are very slow. The letting of new shipbuilding contracts is interrupted by the full condition of shipyards and the difficulty in placing new orders for material.

Sheets.—Black and galvanized sheets are quiet, but blue annealed are moving freely, and merchants' stocks are getting badly depleted. There is a steady demand from manufacturers, while a number of large orders are still appearing for pipe and tank construction. The city of Seattle has placed a contract with Booker, Kiehl & Whipple for a lot of 42-in. pipe for the Lake Washington water main, and the city of Los Angeles has taken figures for over a mile of 8-in. 12-gage pipe.

Wrought Pipe.—With liberal arrivals on old orders, merchants are getting their stocks of butt-weld pipe into fair shape, and as considerable buying was done before the last advance no shortage is anticipated. Current orders for such goods are smaller, but fairly numerous. Jobbing business in the country has been quite active, and some improvement is noted in the local trade. Lap-weld and general oil pipe business shows no curtailment, and conditions are favorable for long-continued activity in this department.

Cast-Iron Pipe.—Municipal business comes out slowly. Palo Alto, Cal., is in the market for a mile of 4 and 6-in. pipe, and Colverdale, Cal., for a small lot of 8 to 12 in. Small corporation orders are fairly numerous. Values have advanced again, being quoted at $36

per net ton for 6-in. and over; $39 for 4-in., and $1 extra for class A and gas pipe.

Pig Iron.—While arrivals on contracts are fairly heavy, some melters are beginning to run short of requirements, and numerous orders are coming out for prompt delivery. There has also been a renewal of contracting for the second half, as the prospects for foundry activity become better assured. Prices stand about as before, No. 1 Southern foundry being quoted at $27 per gross ton.

Coke.—The local demand for foundry coke shows considerable increase, the consumption being much larger than last year, and orders for current shipment are coming out in good shape. Contracting is not especially active at present, but further business for second half is expected before long. Southern coke is quoted here at $16 to $16.50 per net ton.

Old Material.—The demand for steel melting scrap holds up as strongly as ever, with prospects of further increased requirements during the summer, as the open-hearth capacity is increased. Indications are accordingly unfavorable for any weakening in values, though the prices prevailing for the last few weeks promise to bring out plenty of material for some time. Heavy steel scrap is quoted as high as $13 per gross ton, while some lighter material can be bought as low as $8. Cast-iron scrap continues to move at about $14 to $15 per net ton, with a fairly active demand.

Ferroalloys.—Ferromanganese is now closely cleaned up, and there is very little British in sight for the remainder of the year, though consumers report some offerings at extreme prices. Some will no doubt be produced locally, but the output is still very uncertain.

St. Louis

ST. LOUIS, MO., April 17, 1916.

Pig Iron.—Sales have covered amounts of 300 tons and less. Specifications have been free and melters are using up their supplies faster than was anticipated at the time of contracting. Prices are more firmly held than at any time in recent weeks. Altogether the sales of the week will probably run close to 5000 tons.

Old Material.—Scrap market has shown a somewhat firmer tendency. The mills have removed some of the embargoes and are using up material so rapidly that buying, it is expected, will become a necessity within a short time. There have been a number of large sales by brokers and the recent heavy offerings by the railroads have been to a large extent absorbed without serious effect upon the market. We quote dealers' prices, f.o.b. customers' works, St. Louis, industrial district as follows:

Per Gross Ton

Old iron rails	$17.25 to $17.75
Old steel rails, rerolling	17.25 to 17.75
Old steel rails, less than 3 ft.	16.75 to 17.25
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	13.25 to 13.75
No. 1 railroad heavy melting steel scrap	16.25 to 16.75
Heavy shoveling steel	14.25 to 14.75
Frogs, switches and guards cut apart	15.75 to 16.25
Bundled sheet scrap	10.50 to 11.00

Per Net Ton

Iron angle bars	$16.25 to $16.75
Steel angle bars	13.75 to 14.25
Iron car axles	22.75 to 23.25
Steel car axles	25.00 to 25.50
Wrought arch bars and transoms	19.00 to 19.50
No. 1 railroad wrought	16.00 to 16.50
No. 2 railroad wrought	16.00 to 16.25
Railroad springs	15.75 to 16.25
Steel couplers and knuckles	14.75 to 15.25
Locomotive tires, 42 in. and over, smooth inside	18.50 to 19.00
No. 1 dealers' forge	12.25 to 12.75
Cast borings	8.00 to 8.50
No. 1 busheling	13.75 to 14.25
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
No. 1 railroad cast scrap	12.25 to 12.75
Stove plate and light cast scrap	9.25 to 9.75
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00
Pipes and flues	10.75 to 11.25
Railroad sheet and tank scrap	10.00 to 10.50
Railroad grate bars	9.25 to 9.75
Machine shop turnings	9.00 to 9.50

Finished Iron and Steel.—No new contracting has been reported, because of inability to make deliveries as desired. Fabricators report considerable additions to the work in sight. Tentative rail inquiries are in the market, evidently due to the prospect of an advance on standard sections after May 1. Track fastenings are very active. For material out of warehouses, which are pushed to capacity, we quote as follows: Soft steel bars, 3.15c.; iron bars, 3.10c.; structural material, 3.15c.; tank plate, 3.55c.; No. 10 blue annealed sheets, 3.45c.; No. 28 black sheets, cold rolled, one pass, 3.30c.; No. 28 galvanized sheets, black sheet gage, 5.60c.

Coke.—No new contracts have been made, but a number of purchases for immediate wants. Quotations on round tonnages show no change. By-product coke is well held at a parity with Connellsville and Virginia prices, at oven.

New York

NEW YORK, April 19, 1916.

Pig Iron.—The amount of new business is in contrast with the liberal contracting that went on throughout March. The situation is that a good many, though not all, furnaces are sold up late into the year, and that most foundries have provided for their wants for the second half. Filling-in orders are to be expected and now and then a good sized transaction, as in the case of Baldwin Locomotive Works, which took 5500 tons for delivery before July 1. Such a large call for delivery in the second quarter is exceptional. The Pennsylvania Railroad has also been a buyer. The 2500 tons of foundry iron inquired for at Paterson, N. J., has now been placed. Furnaces are not particularly interested in selling for the first half of 1917, though some inquiry has come out for that delivery. The market for basic iron is quiet except for the possibility of purchasers to meet contract deliveries of a producing consumer which now needs more of its own metal than it counted on. A sale of 6000 tons of low-phosphorus iron in Massachusetts is not an unusual transaction, as intimated in some quarters, but is a regular purchase of a large steel interest. There is further inquiry for low-phosphorus iron from Canada, and very considerable amounts of Bessemer iron are wanted for Italy, besides some for France. The opening of New England to pig-iron shipments is welcome relief to many furnaces as well as consumers. Furnaces are making the most of it, realizing that the bars may be put up again any day. There are still some embargoes by the Pennsylvania Railroad against Norfolk & Western shipments, thus cutting off some Virginia furnaces. We quote at tidewater for early delivery: No. 1 foundry, $21 to $21.25; No. 2X, $20.50 to $20.75; No. 2 plain, $20.25 to $20.50; Southern iron at tidewater, $20.75 to $21 for No. 1 and $20.25 to $20.50 for No. 2 foundry and No. 2 soft.

Ferroalloys.—The ferromanganese market is steady, with demand for both spot and contract material very quiet. Here and there a consumer needs a carload or so and has no trouble in obtaining it at $400 to $450. Such sales are to consumers who thought themselves covered, but have used more than they expected. Some large steelmakers have made resales at a handsome profit. The quotation is still $175, seaboard, for delivery to July 1, 1917. One large British producer has sold over one-half of his maximum output for that period, and it is believed others have done likewise. A small lot has just been disposed of for delivery in June at $300. Some British alloy, running from 29 to 35 or 40 per cent, has been sold here in small lots by British brokers at $5.50 per unit. Domestic alloy of the same manganese content is bringing $5 to $5.50 per unit. British makers of ferromanganese are using some South African manganese ore together with the Indian and Brazilian ores, and they have overcome the difficulties hitherto preventing the smelting of Indian ores without the Caucasian. Large quantities of Brazilian ore are reaching England, perhaps more than is coming to this country. About 2000 tons of ferromanganese coming in March, through the port of New York, where little usually comes, will swell the March receipts to nearly 9000 tons, making it almost equal to the best month since Jan. 1, 1915. The Lackawanna Steel Company's No. 2

Colebrook furnace is now producing 80 per cent ferromanganese at a satisfactory rate. With this and other domestic producers, some prospective, the whole situation is greatly changed. For 50 per cent ferrosilicon inquiries are reported to be heavy, especially for export. The quotation is still $83 to $85, Pittsburgh, but producers find the export demand more profitable at $90 per ton, in bond, New York.

Structural Material.—With all that is said about the checking of new enterprises involving fabricated steel because of high prices of building materials, it is well to remember that the volume of business in this division of the steel industry has lately been double what it was a year ago. The contracting in the last three months has averaged over 82 per cent of the capacity of bridge and structural shops of the country, while for the first quarter of 1915, when 1.10c., Pittsburgh, steel was ruling, it was 40 per cent. While no end of projected work has been postponed with a great deal of emphasis on prohibitive cost of materials, these comparative figures lend weight to the claim that withdrawals of offerings are less in number than was the case at the time of the lean market. Much that has been taken out of the market is regarded as potential business to develop with a change in conditions. Meanwhile the movement continues in manufacturing plant extensions and railroad bridge work, placed in the case of the smaller jobs with little or no competition. The handicaps of new contracting are represented by inability to get steel inside of 2½ to 4 months and by prices for cost figuring of 2.45c. to 2.75c., Pittsburgh, for the steel. Where buyers will not pay warehouse prices for quick results they shy at waiting several months, at this time of the year, at least for mercantile and apartment buildings. In the face of the conditions, a surprising number of large structures are being pushed ahead, and many of these very quietly. Late awards include 3000 tons for the Berkeley Arcade, West Forty-fourth Street, and 1000 tons for the Ayer Estate loft, Houston Street, both to the Hay Foundry & Iron Works; 700 tons for the Carpenter apartment, Sixty-sixth Street and Park Avenue; 200 tons for a residence on East Sixty-sixth Street and 300 tons for a convent on East Eighty-sixth Street, all three to the Hinkle Iron Company; 600 tons for the Scribner loft, West Thirty-eighth Street, to George A. Just Company; 350 tons for the Staten Island Shipbuilding Company to Milliken Brothers, Inc., and 3000 tons reported substantially placed with Post & McCord, for the Bush building on West Forty-second Street. Upward of 2000 tons for other fair-sized building jobs has been closed, and the following railroad orders are noted: 1500 tons for the Southern to American Bridge Company; 500 tons for the Maine Central to the Boston Bridge Works; over 1500 tons for the Pennsylvania, 750 tons to the American Bridge Company, 450 tons to Lewis F. Shoemaker & Co., and several hundred tons to the Fort Pitt Bridge Works; 250 tons for the New York Central to Shoemaker & Co.; 200 tons for the Seaboard at Howells, Ga., to the Virginia Bridge & Iron Works; 300 tons for the Barclay Street pier of the New York Central to the Phoenix Bridge Company, and 3000 tons at Chattanooga for the Cincinnati, New Orleans & Texas Pacific to the American Bridge Company. Some Canadian structural work is appearing, including perhaps 1500 tons for the Parliament building at Ottawa, which is likely to take American steel, and a large amount of steel is involved in a station at Newark for the Jersey Central, now again under consideration. Some 2500 tons will be required for two docks for New York City and several live industrial jobs will take 5000 tons. We quote plain material in 10 to 12 weeks at 2.769c. to 3.169c. New York, and 3.10c. out of New York district warehouses.

Steel Plates.—Demand for shipbuilding is bidding up the market. For a round tonnage with deliveries beginning in about two months a price figuring back to over 4¼c., Pittsburgh, has been offered. For prompt delivery 6c. has been paid. Meanwhile, some large industrial plants have executed filling-in contracts at as high as 3½c., Pittsburgh, but only for the third quarter, it is understood. For shipment in ten to twelve weeks there appears to be no difficulty in getting 4.25c., Pittsburgh, and 3.75c. is the ruling figure for the third quarter. Another case of a check to buying owing to high price appears in the withdrawal, perhaps temporary, of 150 coal cars for the Youngstown Sheet & Tube Company. We quote mill shipments at 3.919c. to 4.669c., New York, with little available this quarter, and out of warehouse, 4c., New York.

Iron and Steel Bars.—A round tonnage of soft steel billets has become available to be rolled into bars, but the mill wants 3¼c. to 3½c. This may be taken as the judgment of this particular mill that nothing in the way of a better price is to be gained by waiting longer. Generally, opinion seems to be that prices will remain firm at present levels, but that there will be considerably greater pressure for deliveries. Since April 1 new inquiry has dropped, except in one or two cases. We quote steel bars at 2.669c. to 2.919c., New York, for deferred delivery; iron bars from mill at 2.669c., New York, in two to three months, and iron and steel bars from warehouse at 3.10c., New York.

Cast-Iron Pipe.—The Department of Water Supply, Gas and Electricity of the city of New York opens bids to-day on 477 tons of 8-in. for delivery in the borough of Queens and on 318 tons of 8 to 12 in., for delivery at certain points in the borough of Manhattan. Perth Amboy, N. J., opens bids this evening on about 100 tons, principally 24 to 36 in. The Warren Foundry & Machine Company was low bidder on 186 tons, on which bids were opened April 7 by Fall River, Mass. While municipal contracts are few and far apart, private buying is quite lively. Carload lots of 6-in., class B and heavier, are quoted at $30.50 per net ton, tidewater, class A and gas pipe taking an extra of $1 per ton.

Old Material.—The market shows a downward tendency. The supply appears to have become in excess of the immediate demand. An important consumer in eastern Pennsylvania has asked deliveries on contracts to be deferred until after May 1, while mills at Coatesville are again suffering from an embargo. Relaying rails are higher, as the demand is strong with a light supply. Brokers are paying about as follows to local dealers and producers, per gross ton, New York:

No. 1 heavy melting steel scrap (railroad or equivalent)	$15.50 to $15.75
Yard heavy steel (eastern Pa. specifications)	15.00 to 15.50
Relaying rails	25.50 to 26.00
Rerolling rails	17.25 to 17.50
Iron car axles	26.50 to 27.00
Steel car axles	27.50 to 28.00
No. 1 railroad wrought	21.50 to 22.00
Wrought-iron track scrap	19.00 to 19.50
No. 1 yard wrought, long	17.00 to 17.50
No. 1 yard wrought, short	16.00 to 16.50
Light iron	6.75 to 7.00
Cast borings (clean)	9.50 to 9.75
Machine shop turnings	8.50 to 9.00
Mixed borings and turnings	8.00 to 8.25
Wrought pipe	13.00 to 13.50
Old carwheels	16.00 to 16.50
Malleable cast (railroad)	12.75 to 13.25

Trade with the foundries is of a steady character, although buying is usually of small quantities. Quotations to consumers are as follows, per gross ton, New York:

No. 1 cast (machinery)	$18.00 to $18.50
No. 2 cast (heavy)	16.50 to 17.00
Stove plate	12.00 to 12.50
Locomotive grate bars	12.00 to 12.50

The Chain Belt Company, Milwaukee, Wis., shipped a carload of chain belts to Russia last week and three large paving-type concrete mixers to Honolulu. The chain belts are meant for industrial use. The company is experiencing considerable difficulty in making deliveries by reason of car shortage and embargoes but is able to make liberal export shipments in spite of these handicaps.

William Kennedy & Sons, Ltd., Owen Sound, Ont., Canada, is making a specialty of casting and cutting off steel ingots ready to forge into shells of any size, and particularly those 6 in. in diameter. At the present time about 2500 tons of steel ingots, including shell steel, can be supplied by this company per month for the next six months.

Buffalo

BUFFALO, N. Y., April 18, 1916.

Pig Iron.—Sales for the week totaled about 25,000 tons, covering all grades, and inquiry now before the trade aggregates close to 100,000 tons for various deliveries, a considerable proportion being for shipment to points outside of the regular Buffalo territory. With furnace capacity almost fully booked up for the remainder of the year, this large inquiry is having a stiffening effect on prices, but quotations remain practically unchanged from last week, except that basic is now quoted at $19.50 to $20. We quote as follows, f.o.b. furnace, Buffalo, for current and last half delivery:

No. 1 foundry	$19.50 to $20.00
No. 2 X foundry	19.00 to 19.50
No. 2 plain	18.75 to 19.00
No. 3 foundry	18.75 to 19.00
Gray forge	18.50 to 19.00
Malleable	19.00 to 20.00
Basic	19.50 to 20.00
Bessemer	21.00 to 22.00

Finished Iron and Steel.—Several selling agencies report pressure by customers for delivery of material stronger than at any time within a year. An inquiry is in the market for 2400 tons of bars and shapes from one of the Canadian car companies for second quarter shipment. It is believed that the company was unable to secure that delivery and that some of the mills even declined to quote for delivery at their convenience. A number of instances have developed where consumers and distributers of cold rolled steel are having their stocks depleted and are not able to place specifications for additional material because of the unwillingness of mills to let customers have more than their accustomed quotas. From appearances there has been a strengthening of the situation within the last two or three weeks, and many who thought the crest had been reached are endeavoring to buy material ahead, feeling that the strong demand is likely to last for several months. While there has been a check in the demand for structural steel, this has not seemed to interfere with the generally strong situation. Bids are being taken for 600 tons of structural steel for plant extension of the General Electric Company at Schenectady, and bids are soon to be taken for 800 tons for viaducts over the New York Central, Erie and Lehigh Valley railroads at Niagara Falls for grade crossing elimination. A contract is pending for about 2000 tons for the Union By-Products Coke Company, Buffalo.

Old Material.—The market is still quiet. Heavy melting steel has softened slightly. No large lots are being sold at the reduced prices, however. Dealers believe that prices will again advance to a higher level. Embargoes at different plants, effective on some commodities of the list, are acting as a bar on the volume moved. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$17.50 to $18.00
Low phosphorus steel	21.00 to 21.50
No. 1 railroad wrought scrap	19.00 to 19.50
No. 1 railroad and machinery cast scrap	16.00 to 16.50
Old steel axles	24.00 to 24.50
Old iron axles	24.00 to 24.50
Old carwheels	15.25 to 15.75
Railroad malleable	16.00 to 16.50
Machine shop turnings	8.50 to 9.00
Heavy axle turnings	12.50 to 13.00
Clean cast borings	9.25 to 9.75
Old iron rails	18.00 to 18.50
Locomotive grate bars	12.00 to 12.50
Stove plate (net ton)	11.50 to 12.00
Wrought pipe	14.00 to 14.50
Bundled sheet scrap	13.00 to 13.50
No. 1 busheling	15.00 to 15.50
No. 2 busheling	12.00 to 12.50
Bundled tin scrap	15.00 to 15.50

The annual meeting of the salesmen of the Lunkenheimer Company, Cincinnati, Ohio, was held at the company's plant in that city April 11, 12 and 13. Daily sessions were held at the factory and a dinner was served at the Hotel Gibson each evening. Reports made as to business conditions in all parts of the country were very promising as to the future, although the high cost of raw material was a matter of much concern, and it was conceded that present selling price schedules could not long be maintained.

BRITISH EXPORTS PROHIBITED

Pig Iron and Steel Under Ban—Maximum Prices Fixed—Silicon Higher

(By Cable)

LONDON, ENGLAND, April 19, 1916.

Exports of pig iron and most descriptions of finished and semi-finished steel have been prohibited and maximum prices have been fixed for the home trade. These prices for beams and angles are £11 2s. 6d.; for ship plates, £11 10s.; for boiler plates, £12 10s.; for rails, £10 17s. 6d., and for billets and sheet bars, £10 7s. 6d.

The British ingot steel output for 1915 was 8,350,944 gross tons. American 4-in. billets, 3000 tons, have been sold for June, July and August delivery at $63, c.i.f. Liverpool. Quotations of some products, partly nominal, are as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 33s. 6d., against 32s. 6d. last week.
Cleveland pig-iron warrants, 86s. 6d.
Steel black sheets, No. 28, export f.o.b. Liverpool, £19 15s.
Hematite pig iron, f.o.b. Tees, about 139s.
Steel bars, export, f.o.b. Clyde, £18 5s.
Ferromanganese, £35, nominal.
Ferrosilicon, 50 per cent, c.i.f., £29 compared with £27 a week ago.

Canadian Industrial Notes

With a view to encouraging the zinc industry which has been started in Canada since the outbreak of the war, the government will grant a bounty for a short period after the war. The high prices during the war make such aid unnecessary. Sir Thomas White, Minister of Finance, has given notice of a resolution to pay 2 cents per pound under certain conditions.

The International Molybdenum Company, recently incorporated with a capital stock of $5,000,000, will build a smelting plant at Renfrew, Ontario.

The Ledcote Company of Canada, Ltd., Amherst, N. S., will establish a plant for covering sheets with lead as a substitute for galvanizing. William Knight is president of the company.

Westinghouse, Church, Kerr & Co., New York City, have received the general contract for the construction of a sulphuric acid plant for the Aetna Chemical Company of Canada, Ltd., at Drummondville, Quebec, at a cost of $300,000.

The Consolidated Mining & Smelting Company has started the construction of a plant at the Trail Smelter, Trail, B. C., for the manufacture of sulphuric and hydrofluoric acid, which is expected to be ready for operations in two months. A site is also being cleared for a copper refinery, while the existing lead refinery will also probably be extended. The new plant for the manufacture of zinc is now in operation.

Manganese Ore Exports from India

Manganese ore exports from India in December, 1915, are stated by the London *Iron and Coal Trades Review* to have been 41,897 gross tons, of which 38,397 tons went to Great Britain, 3000 tons to Italy and 500 tons to France. Indian exports of the ore for the first nine months of the fiscal years, April to December, 1914 and 1915, were as follows in gross tons:

Exported to	April to Dec., 1914	April to Dec., 1915
United Kingdom	169,885	295,567
Germany	14,250	.....
Belgium	66,043	.....
France	43,325	4,500
Italy	.....	19,850
Austria-Hungary	4,030	.....
Japan	9,157	3,346
United States	73,503	35,000
Total	380,193	358,263

The total imports of manganese ore into the United States in 1915 were 320,782 gross tons, practically all of it coming from Brazil.

The Red River Furnace Company, Clarksville, Tenn., of which Graham Macfarlane is president, blew in its Helen furnace April 7. It had been idle for several years.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, effective from April 10, 1916, per 100 lb.; New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c.; Pacific coast, 65c. on plates, structural shapes, iron and steel bars, pipe and boiler tubes, tin plate, nails, spikes and wire. The foregoing rates to the Pacific coast are by rail only.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 2.50c. to 2.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 2.75c. to 4c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated Feb. 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3/16 in. take the price of 3/16 in.

Allowable overweight, whether plates are ordered to gage or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under ¼ in. to and including 3/16 in.	.10
Gages under 3/16 in. to and including No. 8	.15
Gages under No. 8 to and including No. 9	.25
Gages under No. 9 to and including No. 10	.30
Gages under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive.	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive.	.50
Cutting to lengths under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Rods.—Bessemer, open-hearth and chain rods, $60, nominally.

Wire Products.—Prices to jobbers, effective Feb. 29: Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, $2.25; galvanized, $2.95. Galvanized barb wire and staples, $3.25; painted, $2.55. Wire nails, $2.40. Galvanized nails, 1 in. and longer, $2 advance over base price; shorter than 1 in., $2.50 advance over base price. Woven wire fencing, 61½ per cent off list for carloads, 60½ off for 1000-rod lots, 59½ off for less than 1000-rod lots.

The following table gives the price per 100 lb. to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$2.30	$2.35	$2.40	$2.45	$2.60	$2.70	$2.80	$2.90
Galvanized	3.20	3.25	3.30	3.35	3.40	3.55	3.90	4.00

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from March 29, 1916, on black and galvanized steel and iron pipe, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	65	33½	⅛ and ¼	54	22
½	69	49½	⅜	55	23
¾ to 3	72	53½	½	59	36
			¾ to 1½	62	41

Lap Weld

2	68	49½	1¼	51	30
2½ to 6	71	52½	1½	57	37
7 to 12	67	47½	2	58	38
13 and 14	58½	..	2½ to 4	60	41
15	56	..	4½ to 6	60	41
			7 to 12	58	39

Reamed and Drifted

1 to 3, butt	70	51½	¾ to 1½, butt	60	39
2, lap	66	47½	1¼, lap	49	28
2½ to 6, lap	69	50½	1½, lap	55	35
			2, lap	56	36
			2½ to 4, lap	58	39

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	61	38½	⅛, ¼ and ⅜	54	32
½	66	48½	½	59	41
¾ to 1½	70	52½	¾ to 1½	63	43
2 to 3	71	53½			

Lap Weld, extra strong, plain ends

2	66	48½	1¼	53	32
2½ to 4	69	51½	1½	58	38
4½ to 6	68	50½	2	60	41
7 to 8	63	43½	2½ to 4	62	44
9 to 12	58	38½	4½ to 6	61	43
			7 to 8	54	36
			9 to 12	49	31

Butt Weld, double extra strong, plain ends

½	57	41½	½	46	29
¾ to 1½	60	44½	¾ to 1½	49	32
2 to 2½	62	46½			

Lap Weld, double extra strong, plain ends

2	58	42½	1½	47	29
2½ to 4	60	44½	2	47	29
4½ to 6	59	43½	2½ to 4	49	34
7 to 8	53	33½	4½ to 6	48	33

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Sheets.—Makers' prices for mill shipment on sheets, of U. S. standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	2.85 to 2.95
Nos. 9 to 10	2.90 to 3.00
Nos. 11 and 12	2.95 to 3.05
Nos. 13 and 14	3.00 to 3.10
Nos. 15 and 16	3.10 to 3.20

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Box Annealed Sheets, Cold Rolled

Nos. 17 to 21	2.65 to 2.70
Nos. 22 and 24	2.70 to 2.75
Nos. 25 and 26	2.75 to 2.80
No. 27	2.80 to 2.85
No. 28	2.85 to 2.90
No. 29	2.90 to 2.95
No. 30	3.10 to 3.15

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Galvanized Sheets of Black Sheet Gage

Nos. 10 and 11	4.00 to 4.25
No. 12	4.10 to 4.35
Nos. 13 and 14	4.10 to 4.35
Nos. 15 and 16	4.20 to 4.45
Nos. 17 to 21	4.35 to 4.60
Nos. 22 and 24	4.55 to 4.80
Nos. 25 and 26	4.70 to 4.95
No. 27	4.85 to 5.10
No. 28	5.00 to 5.25
No. 29	5.15 to 5.40

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, on lap-welded steel tubes and standard charcoal-iron tubes, effective from April 15, 1916, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1½ in.	35	1½ in.	27
1¾ and 2 in.	47	1¾ and 2 in.	39
2¼ in.	44	2¼ in.	36
2½ and 2¾ in.	50	2½ and 2¾ in.	42
3 and 3½ in.	55	3 and 3½ in.	47
3½ to 4½ in.	56	3½ to 4½ in.	48
5 and 6 in.	49	5 and 6 in.	41
7 to 13 in.	46	7 to 13 in.	38

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
April	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
12	28.00	27.75	53.00	7.75	7.62½	19.25	19.00
13	28.25	28.00	53.00	7.75	7.62½	19.25	19.00
14	28.50	28.25	53.00	7.75	7.62½	19.25	19.00
15	28.50	28.25	....	7.75	7.62½	19.25	19.00
17	28.50	28.25	52.00	7.75	7.62½	19.25	19.00
18	28.75	28.50	51.00	7.75	7.62½	19.25	19.00

NEW YORK, April 19, 1916.

Copper is higher, with the market quieter. Tin has had a dull week and quotations are lower. Both the foreign and domestic demand for lead is dull, and the West in particular shows weakness. Activity in spelter has lessened but prices are firm at slightly higher levels. Antimony is dull and firm.

New York

Copper.—It is estimated that in the heavy buying which prevailed until well into last week something like 300,000,000 lb. of copper was taken, the bulk of it by foreign interests. The later buying was on account of domestic consumers. The large business is verified by the fact that producers have no metal to sell in considerable quantities this side of September. In other words, they are sold out for about four months. The market is now quiet relatively, although there is still some inquiry for prompt deliveries, for which buyers are willing to pay premiums of 1½c. to 2c. Electrolytic for future delivery is quoted at 28.50c., cash, New York, and Lake is nominal at about 28.75c. The Lake producers are sold up for months ahead also. The London market is stronger at £137 for spot electrolytic. Until the recent heavy movement the London quotation stood at £136. The exports this month, including yesterday, total 14,273 tons. The European statistics show stocks in Great Britain and France as of April 15 to be 6807 tons, as compared with 5528 tons March 31.

Tin.—The market has been dull, although on one or two days there has been some activity, notably Friday when 300 tons was taken. Yesterday probably 100 tons changed hands, business in spot being done at 51c. The easiness of the market is ascribed to the larger arrivals, 670 tons having arrived on Monday. The total of arrivals is 1345 tons and there is now afloat 5464 tons, of which a considerable quantity is coming direct from the Straits Settlements.

Lead.—Buyers have reached a point where they are refusing to pay the premium prices asked by independent producers, and as a consequence the market has been very dull. The foreign demand seems to have disappeared. The leading interest continues to quote 7.50c., New York, and 7.42½c., St. Louis, as a basis for average prices and has booked some business. The New York outside quotation is about 7.75c., but the St. Louis outside price has dropped to 7.62½c. The crux of the situation lies in the foreign demand. If this becomes strong again prices will advance, but if dependence is had on the domestic market alone they will recede. It is believed that Great Britain is getting more lead from Australia than has been the case in the past, and if this is true Japan will not have to buy in the United States. Exports continue light, totaling up to and including yesterday, 747 tons.

Spelter.—As compared with last week the spelter market is quiet, although there was a fair amount of activity yesterday, when prompt was quoted at 19c., St. Louis, and 19.25c., New York; May at 18.50c., St. Louis, and June at 17.75c. to 18c., St. Louis. The trade is intensely interested in the figures of the United States Geological Survey pertaining to the additional number of retorts which are expected to go into operation this year, and which will make possible a production of about 825,000 tons. This figure does not include 60,000 tons expected to be produced by the electrolytic plants. The conclusion seems to be that the Government report constitutes a bear argument for the future, but no reason is seen for any radical break in spelter prices in the near future. It is pointed out that deliveries for the present quarter are tight, and that a big business is expected for the third and fourth quarters. With regard to the large production, the fact is noted that the large German capacity is unavailable for other than German use; also that galvanizing plants in this country are using far below normal quantities of spelter. The exports this month, up to and including yesterday, total 1279 tons.

Antimony.—Extreme dullness has brought about lower prices. Japanese and Chinese grades were quoted yesterday at 41c. to 42c., duty paid. The supply is more plentiful.

Aluminum.—The quotation for No. 1 virgin aluminum, 98 to 99 per cent pure, is easier at 58c. to 60c.

Old Metals.—The market is strong. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	27.00 to 28.00
Copper, heavy and wire	26.00 to 27.00
Copper, light and bottoms	23.00 to 24.00
Brass, heavy	16.00 to 16.50
Brass, light	13.50 to 14.00
Heavy machine composition	19.00 to 20.00
No. 1 yellow rod brass turnings	16.00 to 16.50
No. 1 red brass or composition turnings	17.00 to 18.00
Lead, heavy	6.75
Lead, tea	6.25
Zinc	14.00 to 15.00

Chicago

APRIL 17.—The market has moved up to still higher prices for copper and spelter. Quotations for tin cover a wide range at a generally lower level than our last prices. We quote: Casting copper, 27.50c. to 28c.; Lake copper, 29.50c.; tin, carloads, 53c to 54c.; and small lots, 55c. to 56c.; lead, 7.75c.; spelter, 19c.; sheet zinc, 25c.; Cookson's antimony, 50c.; other grades, 44c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 22c.; copper bottoms, 20c.; copper clips, 21c.; red brass, 18c.; yellow brass, 14c.; lead pipe, 6c.; zinc, 13.50c.; pewter, No. 1, 28c.; tinfoil, 38c.; block tin pipe, 44c.

St. Louis

APRIL 17.—Metals have been quite active. Lead has been somewhat irregular, but closed to-day at 8.25c. asked. Spelter is higher at 21c. Lake copper is quoted at 32c.; electrolytic copper, 31.50c.; tin, 58c.; Asiatic antimony, 50c. In the Joplin ore district zinc blende was higher, ranging up to $125 per ton, with the average price $107. Calamine sold at $75 to $90, with the average for the week $81. Lead ore brought from $101 to $102.50, with the average for the week $100. The total sales of the week in the district aggregated $1,433,827, almost half a million dollars larger than any previous week in the history of the district. On miscellaneous scrap metals we quote as follows, dealers' buying prices: Light brass, 10.50c.; heavy red brass and light copper, 16c.; heavy copper and copper wire, 19.50c.; heavy yellow brass, 14c.; zinc, 11c.; lead, 5.50c.; tea lead, 3.50c.; pewter, 24c.; tinfoil, 35c.

Spelter Production in 1915

C. E. Siebenthal of the United States Geological Survey, in a report just issued, places the production of primary spelter in 1915 at 489,519 tons, an increase of 136,470 tons, or 39 per cent over the output of 1914. The domestic consumption of spelter amounted to 364,382 tons, an increase of 65,257 tons, or 22 per cent over that of 1914. At the end of 1915, 156,658 retorts were in operation, and in the course of the present year 49,612 retorts are to be added. With the enlarged number of retorts, a production of 825,000 tons annually is indicated, to which must be added 60,000 tons to be refined electrolytically.

At Philadelphia, in the suit brought by Edward B. Smith & Co., bankers and brokers, against W. P. Worth and J. Sharpless Worth for a commission of $925,000 on the sale of the Worth plants to the Midvale Steel & Ordnance Company for $19,500,000, a settlement of the case was made out of court after the trial had been on several days.

Iron and Industrial Stocks

NEW YORK, April 19, 1916.

International relations have again exerted an important influence on prices of stocks. The situation in Mexico and our controversy with Germany both assumed for a few days a phase regarded unfavorably by financial interests and prices receded on Thursday and Friday. A more hopeful view was then taken and a recovery in values was effected which gave way on Monday to another downward turn which was especially severe in stocks of companies having war orders. Changes in some of these stocks were almost sensational. The general list, however, displayed remarkable steadiness. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	26½ - 28⅞	Republic, com.	48⅞ - 50⅞
Allis-Chal., pref.	75¼ - 76½	Republic, pref.	108 - 108⅞
Am. Can, com.	57⅛ - 60⅝	Sloss, com.	52¼ - 55
Am. Can, pref.	111⅜ - 113¾	Sloss, pref.	91½
Am. Car & Fdy., com.	64 - 67¾	Pipe, com.	19⅝ - 21
		Pipe, pref.	50¼
Am. Car & Fdy., pref.	116⅜ - 117	U. S. Steel, com.	82¼ - 84⅝
		U. S. Steel, pref.	117⅛ - 117⅜
Am. Loco., com.	70¼ - 77	Va. I. C. & Coke	50
Am. Loco., pref.	101⅜ - 102	Westg. Electric	60⅜ - 64
Am. Steel Fdries.	49 - 51½	Am. Rad., com.	395 - 397
Bald. Loco., com.	93¼ - 105½	Am. Rad., pref.	135
Bald. Loco., pref.	108½ - 108¾	Am. Ship, com.	44 - 46½
Beth. Steel, com.	424 - 474	Am. Ship, pref.	89
Beth. Steel, pref.	134 - 135	Chic. Pneu. Tool	70¼ - 73
Case (J. I.), pref.	87 - 88	Cambria Steel	81¾
Colo. Fuel	41½ - 44¼	Lake Sup. Corp.	9⅝ - 10¼
Deere & Co., pref.	94½	Pa. Steel, com.	80
Gen. Electric	164⅞ - 167½	Pa. Steel, pref.	98
Gt. No. Ore Cert.	41¼ - 43⅛	Warwick	10⅝ - 10¾
Int. Harv. of N. J., com.	109 - 111½	Cruc. Steel, com.	85¼ - 93¼
		Cruc. Steel, pref.	114½ - 116½
Int. Harv. of N. J., pref.	119½	Harb-Walk. Refrac., com.	84 - 84½
Int. Harv. Corp., com.	73	La Belle Iron, com.	52½ - 54⅜
Lacka. Steel	72¾ - 76	La Belle Iron, pref.	128
Nat. En. & Stm., com.	22½ - 24	Am. Brit. Mfg., com.	23
N. Y. Air Brake	134 - 142	Can. Car & Fdy., com.	66 - 72
Pitts. Steel, pref.	98		
Pressed Stl., com.	48 - 52	Can. Car & Fdy., pref.	84½ - 87
Pressed Stl., pref.	102 - 103	Driggs-Seabury	140 - 150
Ry. Steel Spring, com.	37 - 38¾	Midvale Steel	60¾ - 65½
Ry. Steel Spring, pref.	97½		

Dividends

The J. G. Brill Company, regular quarterly, 1 per cent on the preferred stock, payable May 1.

The American Rolling Mill Company, regular quarterly, 2 per cent on the common stock and 1½ per cent on the preferred stock, payable April 15.

The Packard Motor Car Company, regular quarterly, 1¾ per cent on the common stock, payable May 1.

The Willys-Overland Company, regular quarterly, 1½ per cent on the common stock, payable May 1.

By-Product Coke-Oven Plant at Buffalo

Work has been started on the by-product coking plant of the Union By-Product Coke Company, Buffalo, N. Y. It is located on the Buffalo River, adjoining the blast furnace plant of the Buffalo Union Furnace Company and is to cost, with the land, $1,800,000. Contract for construction has been awarded to the American Coal & By-Products Coke Company, with Westinghouse, Church, Kerr & Co. as supervising engineers. The Roberts type of coke ovens will be used. The entire product of 1000 tons of coke per day has been contracted for by the Buffalo Union Furnace Company. The new plant will provide for the manufacture of benzol and other by-products. M. A. Hanna & Co., Cleveland, Ohio, are to be distributers for the products.

Bids for furnishing the city of Harrisburg, Pa., with the year's supply of five-eighths, three-fourths, inch, one and a quarter, inch and a half, and two-inch water meters will be opened at 3 o'clock, April 26, by Harry F. Bowman, superintendent of public safety, Court House, Harrisburg, Pa.

The estimated pig-iron output of Italy in 1915 was 375,909 metric tons of which 2800 tons was electric furnace iron and 3639 tons charcoal iron. Imports were 175,682 tons.

Lackawanna's First Quarter Earnings

The comparative statement of income account of the Lackawanna Steel Company and subsidiary companies for the quarter ended March 31 is as follows:

	1916	1915	Increase
Total net earnings of all properties after deducting repairs, maintenance, etc.	$3,247,593.30	$199,843.64	$3,047,749.66
Deduct:			
Interest on company bonds and notes	402,500.00	425,783.34	*23,283.34
Subsidiary companies' bond interest	76,662.50	77,475.00	*812.50
Rental and royalties	25,459.00	25,459.00	
Balance	2,742,971.80	328,873.70	3,071,845.50
Less appropriations:			
Extinguishment of mines	71,792.32	32,505.64	39,286.68
Depreciation and accruing renewals	420,111.05	204,379.43	215,731.62
Profit	$2,251,068.43	†$565,758.77	$2,816,827.20

*Decrease. †Deficit.

The gain in profit of $2,816,827.20 on the first quarter of 1915 shows how magnificently the company has recovered from the recent depression.

The unfilled orders March 31 were 871,876 gross tons, against 229,910 tons March 31, 1915.

Another Manganese Ore Company

The Manganese Products Company, 35 Wall Street, New York, incorporated in Delaware, April 1, 1916, has taken over the Kennedy manganese ore mines, located about 5 miles from Lipscomb, Augusta County, Va., formerly owned and operated by the Steel Ores Company of Virginia. About 15 years ago a mill was erected to wash and crush the ores, and since then about 20,000 tons, averaging 45 per cent manganese, was taken out in intermittent operations. The new company is now operating the mine and mill. It controls about 10 miles of property along the Blue Ridge mountains, comprising about 5500 acres. With improvements in the mill about 50 tons of ore a day will be produced, beginning in May. A standard gage railroad, 6 miles long, connecting with the Norfolk & Western, is owned by the company. One object of the new organization is stated to be to assist the small ore producers of that region to increase their output and dispose of their ore as a nucleus for an independent furnace operation.

Donner Steel Company's Improvements

Work is under way or contracts have been let for the following additions to the plant of the Donner Steel Company, Buffalo, N. Y.: A 1200-ft. ore dock, of reinforced concrete, to be equipped with two Brown ore bridges; a 500-ton blast furnace, having four stoves; several open-hearth steel furnaces, stationary, of 80 tons capacity, the exact number to be built not yet definitely determined. Contracts are to be let later for a finishing mill and a by-product coking plant of 60 ovens.

The Rockhill Iron & Coal Company, Orbisonia, Pa., at a special meeting of the stockholders recently voted to increase its indebtedness from $970,000 to $1,470,000. It has two blast furnaces at Orbisonia which formerly manufactured about 35,000 tons of foundry and forge pig iron a year.

The New York office of the Timken Roller Bearing Company and the Timken-Detroit Axle Company, which is in charge of George L. Bitting, will be removed on May 1 from Broadway and Sixty-eighth Street to room 713, United States Rubber Building.

The monthly bulletin of the American Railway Association shows that on April 1 there was a net surplus of empty freight cars on the lines of the United States and Canada of 3650. Those figures compare with a shortage of 20,551 cars on March 1.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

BUYER'S RIGHTS ON ACCOUNT OF BREACH OF WARRANTY.—On being sued by the seller on a note given for the price of machinery, the buyer is entitled to interpose a cross-petition for damages sustained through breach of warranty as to the fitness of the machinery to do the work for which it was intended. Damages recoverable in such case are measurable by the excess of the value of the machinery as warranted above its actual value. (Oklahoma Supreme Court, Murray Company vs. Palmer, 154 Pacific Reporter, 1137.) The fact that a contract of sale gives the buyer the right to return the thing bought if it fails to conform to the warranty does not preclude him from retaining it and asserting a deduction from the agreed price to cover damages for the breach of warranty. But unless an article purchased is absolutely worthless the buyer must return it, or offer to do so, before he will be permitted to recover the full amount of the purchase price. (Kentucky Court of Appeals, Hauss vs. Surran, 182 Southwestern Reporter, 927.)

MACHINERY MANUFACTURER'S LIABILITY CONCERNING INJURIES.—The manufacturer of a passenger elevator is not liable for injuries sustained by a passenger riding on the elevator after its installation in the buyer's place of business, unless it appears that the accident was caused by some defect in construction or installation attributable to the fault of the manufacturer. (Oregon Supreme Court, Bamford vs. Van Emon Elevator Company, 155 Pacific Reporter, 373.)

RIGHT TO DAMAGES ON ACCOUNT OF NOXIOUS GASES.—A land-owner who sues a steel company for injury resulting from noxious gases emitted from burning dumps maintained on the company's nearby premises has the burden of establishing both the nature and extent of injury inflicted upon him. (Pennsylvania Supreme Court, Ribblett vs. Cambria Steel Company, 96 Atlantic Reporter, 649.)

BUYER'S REFUSAL TO RECEIVE SPECIALLY MANUFACTURED ARTICLES.—If a seller is to manufacture the goods contracted to be sold, and there is a repudiation of the contract on the part of the buyer while the goods are being manufactured, the seller is not bound to complete the manufacture and may measure his recoverable damages by the difference between the contract price and the cost of production. (Alabama Supreme Court, Crandall Pettee Company vs. Jebeles & Colias Company, 69 Southern Reporter, 964.)

A MACHINERY SALES CONTRACT CONSTRUED.—Provision in a contract for sale of machinery, binding the seller to replace defective parts for a period of one year without assuming liability for damages or delays caused by such parts, impliedly bound the seller to make good defects within a reasonable time, and on his failure to do so the buyer could recover damages by way of loss of profits, incidental expenses, etc. (North Carolina Supreme Court, Fairbanks, Morse & Co. vs. Twin City Supply Company, 86 Southeastern Reporter, 1051.)

RIGHT TO COUNTERMAND ORDER.—Since an order for goods is not a binding contract, until accepted, the buyer may countermand it any time before acceptance, even though it contain a clause to the effect that it is not subject to countermand, and, having so countermanded the order, the buyer is under no obligation to accept delivery of the goods on their shipment after his repudiation of the order. (South Carolina Supreme Court, Moneyweight Scale Company vs. Gordon Mercantile Company, 86 Southeastern Reporter, 1060.)

PHASES OF ORDERS FOR GOODS.—Under the statutes of Wisconsin a buyer of goods is presumed to have accepted goods notwithstanding any defect in them if he retains them without making objection within a reasonable time. A buyer who retained a vacuum cleaner for 2½ months waived any right to return it. There is no implied warranty of the fitness of a device sold without warranty and described merely by its trade name. The terms of a written order for goods cannot be contradicted by showing that the salesman made verbal representations inconsistent with the writing. (Wisconsin Supreme Court, Ohio Electric Company vs. Wisconsin Light & Power Company, 155 Northwestern Reporter, 112.)

FEDERAL CONTROL OVER BUSINESS CONTRACTS.—All business contracts involving interstate commerce are subject to the power of Congress to affect them by appropriate legislation, and hence leases of machinery in existence when Congress enacted the provision in 1914 to the effect that it shall be unlawful to sell or lease machinery on any condition which would prevent the buyer or lessee from dealing with the seller's or lessor's competitors are subject to that provision. (United States District Court, Western District of Michigan, Elliott Machine Company vs. Center, 227 Federal Reporter, 124.)

PHASES OF PATENT LAW.—The slightest changes which effect a new and useful improvement in a device are patentable. One asserting prior use of a device as precluding patentable invention must prove such use beyond reasonable doubt. (United States District Court, District of Connecticut, Salt's Textile Mfg. Company vs. Tingue Mfg. Company, 227 Federal Reporter, 115.) Neither of two men who jointly constructed a machine is entitled to secure a valid patent therefor as the sole inventor. (United States Circuit Court of Appeals, Eighth Circuit, Smart vs. Wright, 227 Federal Reporter, 84.) It is not contributory infringement of a patent for one to furnish repair parts to the buyer of a patented machine, unless the repairs amount to a reconstruction of the machine, or unless the machine was sold under a contract limiting the right of repair. The buyer of such a machine is entitled to make necessary repairs and replace worn-out parts, not separately patented, so long as the identity of the licensed machine is not destroyed. (United States District Court, District of Delaware, F. F. Slocomb & Co. vs. A. C. Layman Machine Company, 227 Federal Reporter, 94.)

LIABILITY FOR INJURY TO EMPLOYEE.—An employee who has the choice of two ways of doing a given piece of work, one safe and one dangerous, is bound to select the former; and if, instead of so doing, he selects the dangerous way, when he knows or ought to know of the consequent peril, he cannot recover for resulting injury, even though his carelessness may not have amounted to rashness. To charge an employer with liability for injury resulting from a defective condition, there must be proof overcoming the legal presumption that he did not know of the defect and was not negligent in failing to discover it. An employer utilizing machinery is under no legal obligation to use the best and safest machinery obtainable. It is sufficient that the machinery used be of a kind in general use and reasonably safe for all persons operating it with ordinary care. (Georgia Court of Appeals, Belk vs. Lee Roy Myers Company, 87 Southeastern Reporter, 1089.)

DUTY CONCERNING SCRAP-IRON DROP.—A foundry company maintaining a drop for breaking scrap iron is legally bound to provide a system of warning and protection for the benefit of employees required to be or pass near the place under such circumstances as to be endangered through flying pieces of iron. (Illinois Supreme Court, Supolski vs. Ferguson & Lange Foundry Company, 111 Northeastern Reporter, 544.)

BUYER'S WAIVER OF CLAIM OF DEFECT IN MACHINERY.—When a buyer of machinery complains of defects in it, resulting in a trade for a new machine for which new notes are given, he has no right to resist payment of such notes on the ground of defects in the old machinery. (Kansas Supreme Court, Muenzenmayer vs. Hood, 155 Pacific Reporter, 917.)

LIABILITY FOR INJURY TO CUSTOMER.—A dealer in tools is liable for injury to a customer caused by the dealer's salesman's negligence in striking an obviously defective hammer with a heavier one, resulting in a sliver of steel flying into the customer's eye. (Indiana Appellate Court, Mast vs. Borneman & Sons, 111 Northeastern Reporter, 949.)

PERSONAL

W. B. Dickson, John C. Neale and E. E. Slick have been elected directors of the Midvale Steel & Ordnance Company.

Charles F. Rand, J. Parke Channing and Christopher R. Horning of New York, who have been visiting Cuban iron mines recently, will return to New York April 26.

Axel Paulsson recently arrived in New York from Stockholm, Sweden, and will put in operation the two 4-ton Rennerfelt electric steel furnaces at the plant of the Old Dominion Iron & Nail Works Company, Richmond, Va. The furnaces were installed by Hamilton & Hansell, New York.

C. S. Robinson, second vice-president Youngstown Sheet & Tube Company, Youngstown, Ohio, has been appointed a member of the Federal Naval Advisory Board, of which Thomas A. Edison is chairman.

On Wednesday evening, April 12, at the William Penn Hotel, Pittsburgh, a dinner was tendered by about 50 officials, stockholders and employees of the Riter-Conley Mfg. Company, Pittsburgh, to J. Gilmore Fletcher, who recently resigned as president of that company, and also to H. A. Carpenter, who retired as vice-president. Other guests were F. W. Fort, C. F. Fletcher, C. S. Gray and Joseph Riter. A complete silver table service was presented to Mr. Fletcher on behalf of the board of directors, and he was also presented with a platinum watch by employees of the company. Mr. Carpenter was presented with a silver tea service. The presentation speeches were made by Joseph Riter.

Wilbur F. Davis, superintendent of the Bessemer and open-hearth steel plants of the Cambria Steel Company, Johnstown, Pa., has resigned to become superintendent of the Bessemer and open-hearth steel plants of the Aliquippa works of the Jones & Laughlin Steel Company. Joseph Nelson, for about 10 years with the Youngstown Sheet & Tube Company, Youngstown, Ohio, has resigned to become superintendent of the blooming mills in the Aliquippa works.

A dinner was given at the Fort Pitt Hotel, Pittsburgh, on Saturday evening, April 15, to operating officials of 16 departments of the Duquesne steel works of the Carnegie Steel Company. The guests included H. D. Williams, president Carnegie Steel Company; E. J. Hamilton, general superintendent of the Duquesne works and blast furnaces; L. H. Burnett, assistant to President Williams, and in charge of welfare work; A. N. Diehl, assistant general superintendent of the Duquesne works and blast furnaces, and H. G. Saylor, private secretary to President Williams.

John A. Camm, sales manager of the Kearney & Trecker Company, milling machines, Milwaukee, Wis., has resigned to join the newly organized Cleveland Milling Machine Company, Cleveland, Ohio, as vice-president and director of sales and promotion.

R. G. Beechler, formerly chief engineer of the Timken-Detroit Axle Company, metal products branch, Detroit, Mich., has been promoted to the position of works manager to succeed R. J. Goldie, who recently resigned.

H. H. Timken, president Timken Roller Bearing Company, Canton, Ohio, recently arrived home after a vacation spent at San Diego, Cal., where he has a winter residence.

E. S. Cullen, formerly with the Niles Tool Works Company, Hamilton, Ohio, has organized the E. S. Cullen Machinery Company, with offices in the Leader-News Building, Cleveland, Ohio, to handle machine tools, locomotive cranes and other machinery. He is a brother of James K. Cullen, president Niles-Bement-Pond Company.

George Williamson, formerly works manager of the Birtley Iron Company, Birtley, County Durham, England, and previously connected with some of the largest pipe plants in England, is now in the United States and will visit some of the important pipe foundries in the South. Mr. Williamson is known to manufacturers of cast-iron pipe in this country who have visited British works.

William L. Schellenbach, Cincinnati, Ohio, an experienced machine-tool designer and consulting engineer, has opened offices in suite 520 First National Bank Building. In addition to machine-tool work, he will make a specialy of designing factory buildings.

O. C. Skinner, superintendent, has been made general manager of the Standard Steel Works Company, Burnham, Pa., succeeding William Vollmer, who recently resigned.

H. F. Black has been appointed assistant to president of the Midvale Steel Company, Cambria Steel Company and Worth Brothers Company, effective April 15. He will have complete charge of all matters pertaining to ore, coal, coke, limestone, manganese, pig iron, scrap or other similar raw materials, and will be located in the Oliver Building, Pittsburgh, Pa.

Harry Channon has been elected president and James A. Delaney vice-president of the McMaster-Carr Supply Company, 174 North Market Street, Chicago.

C. E. Fairbanks, works manager of the Gilbert & Barker Mfg. Company, Springfield, Mass., has resigned to become manager of the Edison phonograph works, Orange, N. J. He will assume his new duties May 1.

Roger R. Griswold, Meadville, Pa., has been appointed mechanical engineer of the Interstate Commerce Commission.

Harrison Prindle, formerly of South Chicago, is manager of the Lebanon Blast Furnace Company's furnace at Lebanon, Pa., which will soon be started up for the manufacture of manganese products, principally 80 per cent ferromanganese, for which the plant is being especially equipped.

J. W. Spray, who has been connected with the Diamond Chain Company, Indianapolis, Ind., as sales representative in the middle West, has joined the selling force of the Timken Roller Bearing Company, Canton, Ohio.

Military Engineering Lecture in New York

The military engineering lectures, seven in number, which have been held on Monday nights at the Engineering Societies Building, New York, have been so successful that the work is to be continued for those who plan attendance at the camp at Plattsburg, N. Y., later on in the year, or plan to participate in a naval training cruise being arranged. Over 1100 attended the final lecture and a supplementary lecture is now to be given on Monday evening, April 24, by Maj.-Gen. John F. O'Ryan, National Guard New York, on "The Psychology of Discipline," and there are to be two conferences, on May 8 and May 22, following some prescribed reading recommended to those taking the work and including short talks by members of the corps of engineers of the United States Army on "Combat Methods in the Present War," and "The Defense of the Atlantic Coast." Over 400 men who attended the lectures are now drilling once a week, looking particularly to instruction in practical field work. On Saturday, May 13, there is to be a parade in New York City in the interest of preparedness.

The Niles Tool Works Company and the Pratt & Whitney Company will move their Cleveland branch offices May 1 from the Rockefeller Building to 730 Superior Avenue, where they will maintain a display room for machinery and will carry a stock of small tools. A floor space of 40 x 100 ft. will be provided for the display of machine tools.

The Bilsky-Scharbac Company, Milwaukee, Wis., has been incorporated with a capital stock of $25,000 by Max Bilsky, Peter Scharbac and S. D. Stern, to deal in scrap.

Birmingham Visit of Society of Mechanical Engineers

Members of the American Society of Mechanical Engineers en route to New Orleans for the spring meeting of the society spent Monday, April 11, at Birmingham. The visitors were carried over the industrial district on a special train, a barbecue was served at Bayview at 1 o'clock and a banquet was given in the evening in time for the visitors to entrain for the journey to New Orleans. Among the industries visited were the Thomas furnaces, the blast furnaces, open-hearth steel plant and rail mill at Ensley, Edgewater coal mine, Fairfield by-product coke ovens and the plants of the American Steel & Wire Company.

The entertainment of the visitors was in charge of a committee of Birmingham members of the American Society of Mechanical Engineers. Of this R. E. Brakeman, assistant chief engineer of the steel-works and blast-furnace department of the Tennessee Coal, Iron & Railroad Company, was chairman. The other members of the committee were Charles B. Davis of the C. B. Davis Engineering Company; F. G. Cutler, chief of the bureau of steam engineering of the Tennessee Coal, Iron & Railroad Company; J. H. Klinck, Westinghouse Electric & Mfg. Company at Birmingham, and Paul Wright of the column department of the American Cast Iron Pipe Company, secretary of the committee. At the banquet Mr. Brakeman was toastmaster, and speeches were made by Calvin W. Rice, secretary of the society; Frank H. Crockard, vice-president of the Tennessee Coal, Iron & Railroad Company, and Dr. W. F. M. Goss, dean of the College of Engineering, University of Illinois, Urbana, Ill.

New York State Industrial Preparedness Committee Organizes

The Industrial Preparedness Committee, Naval Consulting Board of the United States, New York State Section, appointed by Secretary of the Navy Daniels, met at a luncheon given April 14 at the Bankers' Club, New York, by J. G. White, president of J. G. White & Co., Inc., and formally organized for active operation. The general Industrial Preparedness Committee, H. E. Coffin, Hudson Motor Car Company, chairman, has undertaken an exhaustive census of the industries in the United States to determine in what way and to what extent the various manufacturing plants in the United States are equipped to be of service to the Government in time of war. This census is to have the co-operation of each of five large national engineering societies, and each society has a representative from each State.

At the organization meeting of the New York State Section, J. G. White was elected chairman. The others of the New York State committee are as follows: Charles F. Rand, president Spanish-American Iron Company, American Institute of Mining Engineers; W. H. Marshall, president American Locomotive Company, American Society of Mechanical Engineers; Dr. T. B. Wagner, Corn Products Refining Company, American Chemical Society, and William McClellan, American Institute of Electrical Engineers.

The Canton Sheet Steel Company, Canton, Ohio, last week placed in operation six of its eight new hot mills and will shortly have the other two mills running. The new equipment includes a jobbing mill for blue annealed sheets which will be added to the company's line of products.

The general offices of the Northern Iron Company will be located at 108 Margaret Street, Plattsburgh, N. Y., after April 24. All correspondence and invoices should be sent to that address instead of to Port Henry as heretofore.

The blooming-mill engine of the Minnesota Steel Company, Duluth, which broke down about eight weeks ago, has been repaired and operations resumed. The mill is now running at the rate of 25,000 tons per month.

OBITUARY

WILLIAM R. THOMAS died at Catasauqua, Pa., April 13, aged 88 years. He was born in Wales. Coming to this country, he started to work in a machine shop at Beaver Meadow, Pa., and after a varied experience, became superintendent of the Crane Iron Works, now owned by the Empire Steel & Iron Company. For some years he operated iron plants in the South and later was the consulting engineer for Davies & Thomas Company, who built miles of cast-iron tubing for the New York and Philadelphia subways and the Hudson River tunnels. He received one of the first patents ever issued for a gas engine, and also had patents for milling, furnace and automobile machinery. He leaves four sons, all silk manufacturers.

Capt. W. C. BENNETT, until a year ago president of the Barnard & Leas Mfg. Company, Moline Ill., died April 7, aged 79 years. Entering the employ of Deere & Co., following the Civil War, in which he served, he remained with that firm four years. Becoming associated in 1872 with the Barnard & Leas Company, he remained with it through the remainder of his business career. Prior to becoming president five years ago, he had been secretary and treasurer. He had taken a conspicuous place in the public affairs of Moline.

PATRICK R. DILLON died April 14 at his home in Pittsburgh, aged 78 years. He was born in Ireland and came to this country in 1865. For many years he was connected with the plant of the Hartman Steel Company, Beaver Falls, Pa., which was acquired by the Carnegie Steel Company, and later was for some years purchasing agent of the Carnegie Steel Company at Pittsburgh. For the past 15 years or more, Mr. Dillon was not engaged actively in business. He leaves his widow, one son and two daughters.

FRANK E. THOMPSON, a member of the editorial staff of THE IRON AGE from 1890 to 1909, and from 1909 to 1912 with *Hardware Age*, died at his home in Bayonne, N. J., April 15, aged 62 years. For some years, before coming to the East, Mr. Thompson was connected with A. F. Shapleigh & Co., hardware jobbers, St. Louis.

WILLIAM A. MARTIN, connected with the Universal Rolling Mill Company at Bridgeville, Pa., near Pittsburgh, died April 12, in the home of his mother in Aberdeen, Md., aged 42 years. He had been ill for several months.

ROBERT GAILBREATH, treasurer of the Keystone Driller Company, died at his home in Beaver Falls, Pa., April 12, aged 68 years. He leaves his widow, two daughters and one son.

WILLIAM G. LONG, general superintendent of the Buck's Stove & Range Company, St. Louis, died recently at his home in that city, aged 69 years.

CHARLES T. BEACH, treasurer Sandy Hill Iron & Brass Works, died suddenly April 8 at his home in Hudson Falls, N. Y.

A sales office for the Standard Company's scales, concrete mixers, etc., has been opened at Detroit, Mich., by the Michigan Scale & Supply Company, 82 Woodbridge Street, W., direct representative of the Standard Scale & Supply Company, Pittsburgh. The large volume of business in Detroit territory has made it necessary to have a local connection at that point, to give buyers the benefit of quick deliveries and special service.

The Chicago office and the salesrooms of the Goulds Mfg. Company, manufacturer of pumps, will be located at 12 and 14 South Clinton Street after April 20. The warehouse at 3801 South Ashland Avenue, which was established about four years ago, will still be maintained.

INJUNCTION AGAINST STRIKERS

Interesting Features of a Bridgeport, Conn., Decision

Holding that the members of Bridgeport Lodge, No. 30, International Association of Machinists, had violated the Connecticut statute against intimidation, the superior court at Bridgeport, Conn., issued an injunction on April 13 restraining members of this union from picketing the neighborhood of the Max Ams Machine Company's plant. Following a strike in September, 1915, in which substantially all the employees of the company went out, a system of picketing was put in operation. In commenting on this in its decision the court said that the pickets had repeatedly and offensively accosted and annoyed workmen and prospective workmen and by their concert of action and show of force, covert threats and intimidation, had seriously interfered with the obtaining of workmen by the plaintiff. Cameras were used and persons going to the plant to work were subjected to annoyance and derision by the use of their photographs.

The court said that "the plain statement of facts showed that upon the average man the effect of having to run the gauntlet of these camps two or four times a day is intimidating and threatening in the highest degree. This is not picketing merely for information. It is rather the stationing of a permanent guard in force with the design of intimidating and driving away men and the presence of a police officer was deemed necessary to avoid actual breach of the peace." The order of injunction requires the defendants under penalty of $1,000 fine to cease from patroling or loitering upon the streets at or near paths around the plaintiff's property for the purpose of preventing by "threats, intimidation or otherwise" persons from going to work or continuing at work; from intimidating by threat or act, express or implied; from annoying, hindering, interfering with or preventing "by any other scheme or device," etc.

The decision is of particular interest in view of the fact that there were no attacks by pickets, also in view of the Washington developments of the past two years in connection with strike injunctions.

Customs Decisions

SUGAR MACHINERY

The Board of General Appraisers has made it plain that, in construing the free entry provision of the present tariff as it relates to sugar machinery, a very narrow construction must be given. William A. Brown & Co., New York, imported centrifugal machines, pumps, tanks, sun and planet gear, etc., which it was testified were to be set up in the Arbuckle sugar refinery for the manufacture of sugar. The importing house objected to the collector's action in returning all of the merchandise at 20 per cent under the paragraph specifying "manufactures of metal." The contention was that free entry should be given under paragraph 391 reading "machinery for use in the manufacture of sugar." The Government counsel developed the fact that but 10 per cent of this kind of machinery was used actually in sugar-making, the remaining 90 per cent being used in dye works, in certain chemical processes, and as laundry extractors, and cream separators. Judge Fischer held in his decision for the customs tribunal that, in view of the general use to which the machinery in controversy was put, duty exemption could not be granted. According to the decision, the machinery, far from being used chiefly in the sugar-making industry, was only incidentally and exceptionally used for that purpose. The collector was affirmed and the protests overruled.

POLISHING MACHINES NOT MACHINE TOOLS

Adverse action was taken by the board on protests by Alfred Suter, and Amerman & Patterson, New York, regarding claims for free entry for automatic reed brushing or polishing machines composed in chief value of metal. Their use was for cleaning the reeds of loom machines by means of bristle brushes. Duty was levied at 20 per cent under the metal manufactures provision, whereas the importers claimed 15 per cent as "machine tools." The machines, it was shown, were driven by other than hand power, and were equipped with two circular bristle brushes which, revolving at the rate of 1200 revolutions per minute and moving up and down over the surface of the brass reeds, cleaned and polished them. The decision finding against the contention of the importers said: "Paragraph 165 defines a machine tool to mean 'any machine operated by other than hand power which employs a tool for working on metal.' A brush may be an implement, but it is hardly a tool in the sense that term is used in the tariff act. The protest is therefore overruled and the decision of the collector affirmed."

Metal Trades Convention Program

The convention of the National Metal Trades Association will be called to order at 9.30 a. m., Thursday, April 27, at the Hotel Astor, New York, and after the usual preliminaries, the following program will be followed:

Appointment of convention committees: Credentials, resolutions, constitution, auditing and convention.

Reports of officers: Herbert H. Rice, president; Frank C. Caldwell, treasurer; John D. Hibbard, commissioner, and Homer D. Sayre, secretary.

Reports of standing committees: Industrial Education, F. A. Geier, chairman; Apprenticeship, W. A. Viall, chairman; Membership, J. W. O'Leary, chairman; Prevention of Industrial Accidents, W. H. Van Dervoort, chairman.

New business.

The Thursday afternoon session, beginning at 2 o'clock, will be in the nature of an experience meeting. A number of members who have had labor troubles have been asked to tell about them and have accepted invitations to discuss freely the methods pursued by the association. An opportunity will be given to others who may wish to give suggestions, advice, or tell of their personal experience. Prior to this session a buffet luncheon will be served to the members and guests. The convention banquet takes place Thursday evening at 7 o'clock.

The Friday session will begin at 9.30 o'clock, and it is scheduled to close promptly at noon. The program for this session follows:

Work of Conference Boards, M. W. Alexander.

Industrial Preparedness, Jas. A. Emery.

Reports of convention committees.

Report of nominating committee, F. C. Caldwell, chairman.

Election of officers.

Adjournment.

Special Agent on South American Machinery

The Bureau of Foreign and Domestic Commerce at Washington will hold an examination in May for the position of special agent to investigate the markets of South America for construction materials and machinery. The salary of such agent will not exceed $10 a day for each day in the year. Actual transportation expenses and an allowance for actual subsistence expenses not to exceed $5 per diem will be paid. Application to take this examination should be made direct to the bureau and should set forth the applicant's education, and his experience in the subject of the investigation.

Swedish High Carbon Steel Bars

Swedish high carbon steel bars are being imported into this country. They analyze about 1.10 per cent carbon and when annealed are adapted for use by steel die makers. Importers, however, must furnish them to the consumer satisfactorily annealed, and arrangements are being made for such annealing.

According to J. S. Diller of the United States Geological Survey, the chromic iron ore produced in the United States and marketed in 1915 amounted to 3281 gross tons, valued at $36,744. In 1914 only 591 tons, valued at $8,715, was sold.

Pittsburgh and Nearby Districts

C. H. Todd, who recently resigned as president of the Petroleum Iron Works Company, and E. F. Woodsmith, former president Pennsylvania Tank Car Company, are forming the Standard Car Construction Company, with a capital of $300,000, to build a plant at Masury, near Sharon, Pa. It has secured a site of 43 acres, and at first will make only plate work, but later shops for the building of steel tank cars will be erected. The new concern is capitalized at $300,000, and grading work has already been started.

The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in the William Penn Hotel on Monday evening, April 17, preceded by a dinner. A paper entitled "Lessons in the Learning" was read by Russell R. Clarke, connected with the brass foundries of the Pennsylvania Lines West, on the North Side, Pittsburgh. He reviewed economic and industrial conditions in this country since the start of the European war, and also gave his ideas as to the effect the war will have on American industries.

The Natural Gas Association of America will hold its annual convention in the William Penn Hotel, Pittsburgh, May 15 to 18. At the same time the Natural Gas Supply Association will have an exhibit of oil and gas well accessories in the buildings of the Pittsburgh Exposition Society. Practically all the booths have been taken, and the space covered will be twice the size of that of previous expositions.

The Whitaker-Glessner Company, Wheeling, W. Va., in its last statement, says that in 1915, after paying interest on all bonded and other indebtedness, the net earnings of the company were $1,025,188. This company advises that it has no present intention of building by-product coke ovens at Portsmouth, Ohio.

The stockholders of the LaBelle Iron Works, Steubenville, Ohio, recently re-elected former officers as follows: R. C. Kirk, president; H. D. Westfall, vice-president; G. B. Levan, general manager; George Greer, chairman of the board; D. A. Burt, treasurer, and W. E. Beswick, secretary.

The Atlas Welding & Supply Company, Pittsburgh, has been incorporated with a capital of $10,000 to repair burners, tools, machinery and other articles by the brazing-welding process.

The American Manganese Mfg. Company blew in its No. 2 blast furnace at Dunbar, Pa., April 12, on 20 per cent spiegeleisen. When going properly, the furnace is expected to make from 125 to 150 tons per day. No. 1 Dunbar furnace was blown out April 7, for relining and repairs, and is expected to be ready for blast again about July 1 or earlier. The stack was operated for more than a year on 80 per cent ferromanganese, and is said to have made a very good record for output. Later, No. 2 furnace will probably change from spiegeleisen to ferromanganese, but when this will be done is indefinite.

J. B. Hammond of Boliver, Pa., and the Potter Title & Trust Company, Pittsburgh, have been appointed receivers of the Phoenix Fire Brick Company and the Bolivar Face Brick Company, both of Bolivar.

Mackintosh, Hemphill & Co., Pittsburgh, builders of engines, steel works and rolling-mill equipment, have leased the two-story building at 1227-29-31 Liberty Avenue, in that city, to which it will remove the purchasing and accounting departments. The building was erected several years ago for the United States Postal Department as a railway terminal main sorting headquarters, but the fast growth of the parcels post necessitated a change to larger quarters.

The Cambria Steel Company, Johnstown, Pa., is making rapid progress on the construction of its new blast furnace, which will give it a total of nine. The furnace will make 500 tons of iron per day or more. The blowing engine is being furnished by the Hooven, Owens, Rentschler Company, Hamilton, Ohio.

The new blast furnace under erection by the Republic Iron & Steel Company at Haselton, Ohio, will be built as rapidly as possible, and the company hopes to have it ready for blast possibly in January, 1917. Nearly all the contracts for its equipment have been placed. It will be driven by turbo blowers and is expected to have a daily capacity of 500 to 550 tons.

Stockholders of the Gschwind Furnace Company, Youngstown, Ohio, referred to on page 934a of THE IRON AGE of April 13, have elected officers as follows: W. W. Watson, president; Carl E. Gschwind, first vice-president and general manager; Col. C. F. Ritter, second vice-president; John J. Van Gorder, secretary and treasurer; Dwight Harrison, general counsel.

The National Steel Casting Company, whose new plant at New Cumberland, W. Va., is now in operation making steel castings, has opened an office in room 909 Hartje Building, Pittsburgh, in charge of F. H. Zimmers. Mr. Zimmers also represents in the Pittsburgh district the J. E. Williamson Company, Bellwood, Pa., maker of gray-iron castings.

The Murray Motor Car Company, Pittsburgh, with a capital stock of $400,000, has been incorporated by W. N. Murray, W. W. Vensel and J. W. Pantefract, 5528 Fifth Avenue, Pittsburgh, to manufacture motors, motor vehicles, etc. The three incorporators are also directors of the new corporation and Mr. Pantefract is treasurer.

The Moulthrop Steel Products Company, Beaver Falls, Pa., has filed notice of an increase in its stock from $100,000 to $250,000.

The Carnegie Steel Company has secured in the United States District Court in Philadelphia a judgment against the Capital Transportation Company, a Michigan shipping corporation, for the loss of a cargo of steel rails. This cargo, valued at $96,418.85, was lost in the spring of 1914 when the steamer carrying it foundered near Knige Island in Lake Superior. The company was awarded the full amount of the verdict and also $8,749.09 interest on the claim.

M. S. Zortman, formerly connected with the Brown & Zortman Machinery Company, Pittsburgh, has organized the M. S. Zortman Machinery Company, with offices in room 507, Arrott Building, Pittsburgh, to deal in second-hand equipment.

The Globe Wire Company, Pittsburgh, has been incorporated with a capital of $100,000, with works at Sharpsburg, Pa., to manufacture steel wire, drill rods and other wire specialties. The incorporators are George P. Loomis, Oakmont, Pa.; Edwin Kidd, Sharpsburg, Pa., and Elmer Lewis, Oakmont, Pa.

The Scott Mfg. Company, Elizabeth, Pa., recently organized, has acquired the plant of the United States Safe & Vault Company. The main building is 175 x 407 ft., two stories. John B. Scott, treasurer of the company, is in charge of the plant. Equipment for building special machinery will be installed.

Mortgages on the Tower Hill Connellsville Coke Company, Uniontown, Pa., were foreclosed April 15 by J. R. Nutt and executors of the Frank Osborne Estate, all of Cleveland. The petition showed outstanding and overdue unpaid bonds of $1,000,000, secured by the mortgages and accumulated interest of $100,000.

Midvale Contract for British Guns

The Midvale Steel & Ordnance Company has taken a contract for 100 8-in. howitzers for the British Government at $2,700,000. Deliveries are to be made within the next 15 months. The Midvale Company, while fully equipped to manufacture the barrels of heavy ordnance, will need to provide facilities for manufacturing gun carriages, recoil mechanism, etc., and a large shop for this work is to be erected as speedily as possible.

The machine-tool dealers and machinery supply interests of Chicago have in process of organization an association in the nature of a machinery club. The enterprise is still in a formative stage, meeting weekly for the perfecting of an organization. At their meeting held Monday, C. W. Blakeslee of the H. A. Stocker Machinery Company presided. It is hoped that this organization will bring together all of the machinery interests of the Chicago district.

Machinery Markets and News of the Works

RUSSIANS BUYING HEAVILY

Machine-Tool Builders Are Expanding

Easier Deliveries Indicated—Plant Extensions Have Created Big Demand for Transmission Machinery, Cranes, etc.

In New York Russian buyers have been placing large orders, the aggregate of which will reach several hundred thousand dollars. A good part of this buying is being done for Russian manufacturers through the Allied Machinery Company of America, while the Russian purchasing commission has been ordering extensively also. Large domestic orders are few, but a good scattered business is being done.

In the principal machine-tool building centers new business has quieted down considerably, partly because of delayed deliveries, but the tool makers are rushed to capacity to fill orders. As rapidly as conditions will permit they are increasing their capacity for production. Meanwhile small orders continue at an excellent rate.

Throughout the country the large number of new factories and plant extensions has created a heavy demand for transmission and conveying machinery, cranes and general equipment. The steel companies continue to make important purchases.

The Nathan Mfg. Company, New York, has taken bids for the construction of a large plant at Flushing, N. Y., where injectors will be made, at an estimated cost of $250,000. The Erdle Perforating Company, Rochester, N. Y., has begun the construction of an extension to its plant to cost $25,000.

The Traylor Engineering & Mfg. Company, Allentown, Pa., will construct several buildings for the manufacture and storage of crushing and mining machinery. The Electric Storage Battery Company, Philadelphia, Pa., will expend about $250,000 on an 8-story reinforced concrete factory building.

In New England plant extensions are numerous and varied. The Morris Mfg. Company, Springfield, Mass., has been incorporated with a capital of $250,000 to manufacture die-casting machines. It will lease a factory near New York for the present, and later erect a factory at Springfield.

The city officials of Baltimore, Md., have adopted a bulletin system whereby they post every Monday lists of machinery required by the municipality.

The Cleveland Milling Machine Company, Cleveland, Ohio, which is building a plant for the manufacture of milling machines and milling cutters has placed some orders for equipment and will buy more.

The Detroit Seamless Steel Tube Company, Detroit, Mich., has purchased a 12-acre site on which it will erect a plant several times the size of its present one.

In Milwaukee extensions to tool works will soon take care of orders with greater ease than now prevails; meanwhile night and day operations continue. The Lutter & Gies Company, Milwaukee, has disposed of its shaping machine business to the Milwaukee Shaper and Transmission Appliance Company. The new company has leased a plant which it will equip to manufacture the shapers under the same design and name.

Cincinnati notes a falling off in the foreign demand for machine tools, but its place is being taken by domestic requirements, the automobile makers being especially active purchasers. Small engine lathes have appeared in considerable number in Cincinnati, but the larger sizes, both new and second hand, are difficult to obtain for prompt delivery. The rubber tire manufacturers are buying boring mills.

Exceptional activity is shown by machinery buyers in the Pacific Northwest. Record breaking sales of logging engines and boilers and marine hoisting engines and accessories are reported.

New York

NEW YORK, April 19, 1916.

A business of large proportions is being done with Russian purchasers on behalf of both the Russian Government and private manufacturers in that country. Buying running into large figures has been done by the Allied Machinery Company of America acting for K. Jouravleff, all of his orders being placed through the company. He represents several manufacturers in Russia.

The Russian Purchasing Commission, Fuller Building, New York, has also been buying actively, and has placed orders for a number of large turret lathes and boring mills, among other tools.

New orders from countries other than Russia are not especially heavy, although tool builders and exporters are busy in the endeavor to make deliveries against old orders. Dealers are supplying some of the machines needed for export to Russia.

Some of the export business ties up a good deal of capital for a longer time than the exporters find agreeable. For instance, when a tool builder ships he draws a sight draft against the dealer, and the latter does not get his money until he can show a dock receipt, or possibly a steamship bill of lading. With railroad freight conditions as they have been in recent weeks it is two or more weeks before a shipment reaches New York, and because of the shortage of steamships, perhaps two or three weeks more elapse before the tools can be unloaded at the steamer dock, meanwhile the dealer's capital is out of his hands and unremunerative.

Large domestic orders are few, but there continues a good miscellaneous demand. The aggregate of sales, however, is naturally much smaller than it was a short time ago. Unsatisfactory deliveries of some standard tools continue a restricting factor. On the whole, collections are good, although some of the munitions makers are inclined to be a little slow, presumably because they have exhausted the initial payments they received with orders, and meanwhile are behind on deliveries which would furnish the basis for further payments from the representatives of the Allies.

The Lehigh Valley Railroad is buying against a small list.

An Eastern pump company, which took one or two orders for steel shells, is offering for sale about thirty engine lathes and ten turret screw machines.

The list of Agar, Cross & Co., Ltd., 11 Broadway, New York, referred to a week ago, comprises over 500 tools. The company is principally an exporting house shipping to its own branches in South America.

Gould & Eberhardt, Newark, N. J., makers of shaping machines, are among the tool builders who have recently placed orders for additional equipment.

The Twinvolute Pump & Mfg. Company, 30 Church Street, New York, is inquiring for about twenty-five machine and pattern shop tools.

Schaum & Uhlinger, Philadelphia, Pa., makers of knitting machinery may come in the market for tools to equip an addition to their plant.

Lilpop Brothers, of Moscow, Warsaw and Petrograd, have established a New York branch at 11 Broadway, and are interested in the purchase of all kinds of engineering supplies.

The Peelle Company, manufacturer of firedoors and safety appliances for elevators, has started the construction of a two-story factory, 57 x 200 ft., having 24,000 sq. ft. of floor space with Long Island Railroad switch, at Stewart Avenue and Harrison Place, Brooklyn, N. Y., to which it plans to remove about May 15. It has been compelled to abandon its present factory at Reid Avenue and Chauncey Street, because of the rapid growth of its business. The new factory will double its former plant capacity. C. W. Peelle is general manager.

The Globe Woven Belting Company, Buffalo, N. Y., has been incorporated with a capital stock of $50,000 to make solid-woven belting, which it will waterproof. John Ferrick is president, Michael Beecher, vice-president; H. F. Bingham, treasurer, and Otto G. Volger, treasurer.

The Nathan Mfg. Company, 101 Park Avenue, New York, received bids April 15 through its architect, Eugene Schoen, 106 East Nineteenth Street, New York, for the construction of a plant at Flushing, N. Y., for the manufacture of injectors. It is to be built in three sections, each 59 x 326 ft., and will have in addition a warehouse, three stories, 40 x 127 ft., and an administration building, two stories, 50 x 110 ft., estimated to cost in all about $250,000.

It is reported that the Northwestern Brass & Aluminum Company, Rochester, N. Y., has had plans drawn by J. H. Oberlies, Granite Building, Rochester, for the construction of a one-story foundry, 50 x 120 ft., to cost about $10,000. Mr. Hetzler, 14 Riley Street, is in charge.

The General Electric Company, Schenectady, N. Y., has started the construction of a one-story factory building, 51 x 312 ft., to cost about $25,000.

The Smith & Caffrey Company, Syracuse, N. Y., operating the Syracuse Architectural Iron Works, has recently purchased a site for a new building, but does not plan to begin construction until late next fall.

The American Malleables Company, Lancaster, N. Y., advises, in regard to reported large investments in new construction, that the only work being done is in rounding out the various departments and in adding new equipment to bring its process of manufacture up to date. A. S. Blagden is vice-president.

The Wizard Electric & Mfg. Company, 203 State Street, Rochester, N. Y., has been recently incorporated with a capital stock of $10,000 to manufacture an electric soldering and fusing machine for the manufacture of small hardware, jewelry, etc., which it will put on the market about May 1. A. F. Bircher is president, Charles H. Sampson, secretary, and James L. Whitley, treasurer.

The Erdle Perforfating Company, Rochester, N. Y., has awarded contract to the Alexander Shumway & Utz Company, Exchange Place Building, Rochester, for the construction of a one-story addition to its factory, 50 x 214 ft., to cost about $9,000.

Amos R. E. Pinchot, 60 Broadway, New York, has awarded contract to the Hasco Building Company, 245 West Fifty-fifth Street, for the construction of a twelve-story automobile service building, 100 x 148 ft., for the estate of Mary E. Pinchot, to cost about $300,000. The Harris-Silvers Baker Company has been awarded the structural contract.

The Syracuse Motor Car Company is having plans drawn by Taber & Baxter, Gurney Building, Syracuse, for the construction of a three-story garage and service station, 50 x 80 ft., to cost about $40,000. David Grody is president.

The Macks Machine Company, Utica, N. Y., incorporated last June with a capital of $50,000 by Anthony J. Kieffer, Patrick J. McElligott and Francis W. Stedman, has suspended operations for the present.

The Binghamton Boiler Compound Company, Binghamton, N. Y., which was taken over by the Reynolds Boiler Compound Company, of Binghamton, recently incorporated, will be continued by the incorporators of the new company, which they will dissolve.

The Engel Mfg. Company, 239 West Genesee Street, Syracuse, N. Y., has let contracts for erection of a two-story building, 39 x 80 ft., at Oneida and Temple streets.

The Covert Gear Company, Inc., Lockport, N. Y., has been incorporated with a capitalization of $1,000,000 to manufacture gears, trucks, transmissions, etc. B. V. Covert, Grand Street, Lockport; P. V. Clum and W. V. Armstrong, 841 Powers Block, Rochester, are the incorporators.

Contract has been awarded for an addition to the machine shop of the Ingersoll-Rand Company, at Painted Post, N. Y.

The Justin Seubert Company, Syracuse, N. Y., will soon take bids for an addition to its factory at 506 South Clinton Street, steel frame and brick construction.

The Driggs Seabury Ordnance Company, 50 Church Street, New York City, has let contract to Westinghouse, Church, Kerr & Co., New York City, for erection of a four-story and basement factory building, 50 x 300 ft., at Utica, N. Y., at a cost of $90,000.

The American Locomotive Company is to add a new cylinder shop to its plant in Schenectady, N. Y.

The Hammond Steel & Forging Company, 1400 Milton Avenue, Syracuse, N. Y., has let contract for a one-story addition, 35 x 109 ft., to its plant on Milton Ave.

The Hinman-Boynton Granite Company, Syracuse, N. Y., is to build a one-story shop on Oakwood Ave. to cost $10,000.

The Otis Elevator Company will add a one-story annealing building to its Buffalo plant at Northland Avenue and the New York Central Railroad Belt Line.

The Pierce-Arrow Motor Car Company, Buffalo, has filed plans for a four-story addition to its plant at Elmwood Avenue and the New York Central Railroad Belt Line, estimated to cost $100,000. Concrete construction.

The Lefever Arms Company, Syracuse, N. Y., is having plans prepared for a two-story factory addition, 44 x 144 ft., of brick, to cost approximately $25,000.

The Continental Heater Company, Dunkirk, N. Y., has commenced construction of a large warehouse building at its radiator works on Middle Road.

The Erie & Western Transportation Company will soon let contracts for the erection of a grain elevator of reinforced concrete, at Erie, Pa., at an approximate cost of $350,000. W. W. Farley is manager.

Philadelphia

PHILADELPHIA, PA., April 17, 1916.

The Traylor Engineering & Mfg. Company, Allentown, Pa., which planned to acquire more property for the increase of its plant, has been compelled to alter its plans and will increase the height of its present buildings. New buildings, however, will be constructed, including a boilerhouse to cost $60,000; a machine shop, 200 x 536 ft., a four-story warehouse, 70 x 200 ft., to be fitted with a 50-ton crane in which the company plans to carry in stock several hundred thousand dollars' worth of crushing and mining machinery; an administration building; a munition building and the enlargement of its facilities for the manufacture of pumping machinery, for which it has orders which will keep it busy until next year. W. J. Roberts is first vice-president.

The Henry Disston & Sons File Company, Philadelphia, Pa., has increased its capital stock from $500,000 to $750,000 by reason of the increased volume of its business, which has made necessary additional facilities.

The Carpenter Steel Company, Reading, Pa., has awarded contract for the construction of its new one-story mill building, for which it was recently asking for bids. It will be 73 x 387 ft., and is estimated to cost about $50,000. The Reading Construction Company has the contract.

The William Steele & Sons Company, 1600 Arch Street, Philadelphia, has been awarded contract for the construction of an eight-story reinforced concrete factory to be erected at Nineteenth Street and Allegheny Avenue for the Electric Storage Battery Company at a cost of about $250,000.

Denny, Hilborne & Rosenbach have awarded contract to H. E. Baton, Twelfth and Sansom streets, Philadelphia, for a paint plant, to be erected on North Twelfth Street at an estimated cost of $20,000.

Permit has been granted for the erection of a one-story brick foundry, 50 x 58 ft., for the Enterprise Mfg. Company, Third and Dauphin streets, Philadelphia, estimated to cost about $6,000.

Samuel Jones & Son, manufacturers of boxes, 2230 Hamilton Street, Philadelphia, have purchased property at 3207 Spring Garden Street, and will occupy it as a box factory.

The Duplex Metallic Company, Conshohocken, Pa., has purchased from Bland & Co., a steel building, 65 x 196 ft., at Pottstown, Pa., and has awarded contract to Robert McDonald of Philadelphia for its removal to Conshohocken, where it will be added to the Duplex Company's plant.

The Frog & Switch Mfg. Company, Carlisle, Pa., is enlarging the capacity of its plant by the addition of a side floor, 60 x 120 ft.

The Lebanon Boiler Works, owned by J. K. Petty & Co., Inc., Lebanon, Pa., has acquired additional land for plant extension. An extension, 50 x 225 ft., is being erected for a craneway and a laying-out department is being built.

The rebuilding of the machine shop of the Weimer Machine

Works, Lebanon, Pa., recently destroyed by fire, is completed, and the machinery is being installed.

The Allen-Le Noir Company, Philadelphia, has been incorporated with a capital stock of $5,000 by Arthur H. Allen, 1713 North Fifth Street; Eugene F. Le Noir, 5811 Master Street, and Merton W. Greims, Seventeenth and Walnut streets, Philadelphia, to manufacture power machinery and accessories, etc.

The Harrisburg-York Mausoleum Co., Harrisburg, Pa., has been incorporated with a capital stock of $6,000 to erect mausoleums. G. W. Pfalzgraff, York, Pa., is treasurer.

The Pneumatic Shock Absorber Company, Philadelphia, has been incorporated, with a capital stock of $10,000, by William E. Jordan, 1511 Wingohocking Street, Philadelphia; Ashley H. Fox and Arthur H. Burton, to manufacture shock absorbers, automobiles, motor trucks, accessories and supplies.

The National Crate Company, Williamsport, Pa., has been incorporated, with a capital stock of $10,000, by F. H. Gaige, C. B. Radcliffe, Bertha E. Radcliffe and Florence M. Gaige, all of Williamsport, Pa., to manufacture shipping crates from wood and metal.

The Stern Mfg. Company, Inc., Philadelphia, has been organized, with a capital stock of $50,000, by Samuel Stern, 3007 West Oxford Street; Bertha Stern and Martin L. Fredericks, 3533 North Thirteenth Street, Philadelphia, to manufacture moving picture machines and accessories, general machinery, etc.

New England

BOSTON, MASS., April 17, 1916.

New England is practically clear of freight embargoes now with the exception of the cities of Hartford, New Britain, Bristol and Waterbury, and the prospect is that these cities will be open within a week. Congestion still continues and is a large factor in several places where railroad facilities are too limited for the business offered. Torrington, Conn., is so placed and the manufacturers a few days ago issued a letter to the New Haven Railroad officials which was practically an ultimatum. It has brought a prompt response in the way of conferences and will probably result in some improvement of the freight handling in that section.

There has been no change in the labor situation. The strike at the Hendey Mfg. Company, Torrington, Conn., is the only difficulty of any size now existing. The pickets at the Max Ams Company, Fairfield, Conn., have been enjoined from continuing their activities, and this is regarded as a set-back to the machinists' union of Bridgeport, which has been picketing this plant for months.

The Bristol Brass Company, Bristol, Conn., has given its employees an increase of 10 per cent in wages.

The plant of the Shortell Iron Foundry, Seymour, Conn., was destroyed by fire April 14.

The Alsatian Machine Company, Boston, Mass., has been incorporated with capital stock of $100,000 by William H. Huy, Edward W. Atkinson and John H. Woodman.

The Holden Mfg. Company, Boston, Mass., has been incorporated with capital stock of $99,000 to manufacture special machinery. The incorporators are Hiram, Luman and Roswell O. Holden.

The Blake & Johnson Mfg. Company, Waterbury, Conn., has announced a 5 per cent bonus on all wages from Jan. 1 to March 31.

The Morris Mfg. Company, Springfield, Mass., has been incorporated with a capital stock of $250,000 to manufacture die-casting machines, developed by Albert W. Morris of Springfield. Leon J. Harley, Jr., of the Harley Company, and other Springfield and New York interests are stockholders. It is planned to erect a factory this summer on Page Boulevard, Springfield, and a building will be leased, probably near New York, for immediate use.

The Reed & Prince Mfg. Company, Worcester, Mass., has plans for a one-story addition, 56 x 90 ft.

The Wonder Pipe Bending Machine Company, Boston, Mass., has been incorporated with a capital stock of $50,000. S. V. Putnam is president and Arthur C. Putnam treasurer.

The Bridgeport Metal Goods Company, Bridgeport, Conn., will build a four-story factory, 60 x 157 ft., at Pine and Cherry streets.

The Torrington Mfg. Company, Torrington, Conn., has awarded a contract for an office building, 35 x 76 ft., two stories, on Franklin Street.

The D. & W. Fuse Company, Providence, R. I., has plans for a three-story addition.

The Plume & Atwood Mfg. Company, Thomaston, Conn., has voluntarily granted its employees an increase in pay of 20 cents per day.

The American & British Mfg. Company, Providence, R. I., is having plans drawn for an addition to its plant on Charles Street.

The Chase Metal Works, Waterbury, Conn., will build a factory, 60 x 180 ft., five stories, on Thomaston Avenue. It has also purchased land adjoining its plant in Waterville, Conn., from the American Pin Company but has no intention of building at present.

The American Brass Company, Waterbury, Conn., has purchased twelve acres along the Housatonic River in Stratford, Conn.

The Falls Clutch & Machinery Company, Boston, Mass., recently incorporated, succeeds the Falls Rivet & Machinery Company and will specialize in the manufacture of transmission machinery. It will have salesrooms and offices at 52-58 Purchase Street, Boston, and 206-208 Fulton Street, New York.

The Turners Falls Lighting & Power Company, Turners Falls, Mass., has awarded a contract for an addition to its power plant.

The Spencer Wire Company, Worcester, Mass., has awarded a contract for an addition, 52 x 100 ft., three stories.

The Vitrified Wheel Company, Westfield, Mass., is adding another story to its plant.

The New England Brass Company, Taunton, Mass., will proceed immediately with the construction of its plant. H. C. Carpenter will be general manager and purchasing agent.

The Holyoke Specialty Mfg. Company, Holyoke, Mass., has been incorporated with capital stock of $10,000, by John H. Rose, Alexander McAuslan and Thomas MacBean. The company will occupy leased quarters on Sargeant Street and will manufacture a motor power washing machine.

Chicago

CHICAGO, ILL., April 17, 1916.

The notable increase in the erection of new factories and plant extensions that followed some months after the earlier demand for machine tools for export shipment, has created a business in auxiliary shop equipment, transmission machinery, cranes and conveying machinery, which did not develop with the first rush of machine tool buying; but it now is taxing the builders' capacity. Inquiry for equipment of this class is voluminous and diverse. In addition to the demands from the general machine shop and foundry operations, a very large business has come from the impressive additions to mill capacity in the lake district south of Chicago. The Inland Steel Company, Illinois Steel Company, Indiana Steel Company, American Sheet & Tin Plate Company and Interstate Iron & Steel Company have made important purchases. For construction purposes and for permanent installation these companies have also bought a large number of machine tools.

Sales of machine tools continue to reflect the preponderance of the very satisfactory business, made up of orders from local manufacturers for from one to a half dozen machines. The Milwaukee Shaper & Transmission Appliance Company placed its order at Chicago for a universal miller, a boring mill and three or four other machines.

Holmes Pyott & Co., 159 North Jefferson Street, Chicago, iron and structural steel workers, have had plans prepared for a new plant to be built on the site they have owned for some time at Lake Street and Kilpatrick Avenue.

R. R. Baker, 912 Margate Terrace, Chicago, has let the contract for a one-story factory to be erected at 312 South Green Street. It will be 75 x 117 ft., and will cost $9,000.

The Lawrence Mfg. Company, 9 South Clinton Street, Chicago, manufacturer of gasoline lamps, is erecting a seven-story manufacturing building, 42 x 130 ft., to cost $70,000.

F. V. Wolcott, 4407 North Winchester Avenue, Chicago, is about to erect a one-story machine shop to cost $8,000.

A. M. Harroun, 5501 Cornell Avenue, Chicago, has had plans prepared for a one-story garage and machine shop, 100 x 120 ft., to be erected at 5519 Cottage Grove Avenue and to cost $20,000.

The Stover Engine Works and the Stover Mfg. Company, Freeport, Ill., allied interests, have been merged under the corporate title, the Stover Mfg. & Engine Company, with a capital of $3,000,000.

The Continental Motor Mfg. Company, Detroit, has begun the construction of a new machine shop addition at its Muskegon, Mich., plant.

The James Phillips & Son Company, Omaha, Neb., conducting an automobile repair shop, has moved into larger

quarters which are being equipped with additional machinery, principally lathes and drills.

The Illinois Central Railroad has had the work started on the extension to its machine shops at Waterloo, Iowa.

The Citizens Gas & Electric Company, Waterloo, Iowa, is preparing a site for a power plant to be erected this spring at a cost which will approximate $500,000.

The Standard Oil Company, Robert N. Allen, superintendent of construction, Chicago, is receiving bids providing for the erection of its general shop buildings at St. Joseph, Mo., including machine and repair shops.

The Hanley Automobile Company, 415 East Jackson Street, Muncie, Ind., is about to erect a garage completely equipped for repair work at a cost of $20,000.

The Elwood Foundry Company, Elwood, Ind, has been incorporated by M. H. Pilkington of that city, who recently bought the plant of the Elwood Iron Works, which has been idle for some time. The equipment is now being overhauled and increased as the plans of the new company require.

The Kokomo Oscillating Fan Company, Kokomo, Ind., has been organized with a capital of $125,000 to manufacture electric fans. The incorporators are T. F. English, E. B. Seaward and F. H. Smith.

The Hall Mfg. Company, Muncie, Ind., has been organized to manufacture light metal specialties and electrical goods. It has purchased the Muncie Enameling Works, comprising a plating, polishing and enameling plant, to which it has added a machine shop and stamping department. J. M. Quick is president, Harry T. Hall is vice-president and manager, and Clifton W. Hall is secretary and treasurer. The plant is fully equipped; but the company is seeking steel tubing in small sizes, etc.

The Hugo Mfg. Company, Duluth, Minn., manufacturer of light metal goods, has started the construction at Forty-ninth Avenue West and Halifax Street, of a two-story brick and concrete plant containing about 20,000 sq. ft. of floor space, a one-story office building and a boilerhouse. Considerable addition is being made to the sheet metal-working department, about $10,000 worth of new machinery being added. The plant will be ready for occupancy July 1. R. T. Hugo is president and general manager and George H. Reese is assistant secretary. The estimated cost is $30,000.

The Hudson & Thurber Company, manufacturer of hardware specialties, implements, automobile accessories, etc., 308 Third Avenue North, Minneapolis, Minn., advises that it has recently succeeded to the business of the Kegler Mfg. Company at Waterloo, Iowa.

Detroit

DETROIT, MICH., April 17, 1916.

The Detroit Seamless Steel Tube Company, Detroit, has purchased a site of twelve acres in the west Detroit manufacturing district, on which it will erect a new plant many times larger than its present one. It manufactures boiler tubes and tubes for railway and automobile trades. A. A. Templeton is president.

The Walker Mfg. & Supply Company, Detroit, has acquired a new building, 100 x 200 ft., at 61-69 West Woodbridge Street, to take care of its rapidly expanding business. It is a large dealer in plumbing and heating supplies and power equipment.

The General Motors Company, Detroit, has acquired a tract of thirty-five acres in the northeastern part of the city, on which, it is rumored, a new plant will be built for the Cadillac Motor Company, a subsidiary of General Motors. Confirmation of the statement that the Cadillac Company will locate on the tract is not obtainable.

The Trussed Concrete Steel Company, Detroit, manufacturer of steel products, has increased its capital stock from $2,000,000 to $3,000,000.

The Johnson & Walters Mfg. Company, Detroit, has been incorporated with $8,000 capital stock to manufacture automobile accessories. The stockholders are J. P. Johnson, C. W. Walters and C. J. Johnson.

The York Carburetor Company, Detroit, has been incorporated with $60,000 capital stock to manufacture carburetors and other automobile supplies. Lorne M. and Archibald York are the principal stockholders.

The Crescent Brass & Pin Company, Detroit, manufacturer of brass specialties, will erect a two-story addition to its plant at 1150 Trumbull Avenue, to cost about $15,000.

The Auto Body Company, Detroit, has purchased the plant formerly occupied by the Lansing Brewing Company and will remodel it to make automobile bodies.

The business of the Jackson Rim Company, Jackson, Mich., manufacturer of automobile rims, has been acquired by the Perlman Rim Corporation of New York. Ground has been broken for an additional building of 40,000 sq. ft. floor-space.

The Monroe Motor Company, Flint, Mich., manufacturer of automobiles, will remove its plant to Pontiac, Mich., where a larger factory has been secured.

The Walcott & Wood Machine Tool Company, Jackson, Mich., has decreased its capital stock from $150,000 to $100,000 and changed its name to the Walcott Lathe Company.

The Michigan Pattern Works, Detroit, is erecting a one-story addition to its plant.

Monroe, Mich., will issue $90,000 in bonds for improvements and extensions to the electric light plant.

Lawrence, Mich., will issue $10,000 in bonds for a lighting plant.

The Ionia Floor Board Company has been recently organized at Ionia, Mich., for the manufacture of automobile body wood parts. The directors and officers comprise most of the directors of the Hayes-Ionia Company, manufacturer of sheet-metal parts and bodies. The new company will take care of an overflow of the work in that line from the Hayes-Ionia Company and the Hayes Mfg. Company of Detroit, Mich. Its officers are H. B. Webber, president and general manager, H. Jay Hayes, vice-president, and G. W. Webber, secretary and treasurer.

The Novo Engine Company, Lansing, Mich., has let a contract for the erection of an additional foundry building, 120 x 240 ft., which will double its capacity in finished castings. In March this company produced 625 tons from its gray-iron foundry.

The Piston Ring Company, Muskegon Heights, Mich., has let contracts for a four-story steel and concrete addition to its machine shops and a new foundry, which will represent an investment in buildings and machinery of $75,000. It is expected that the new construction will be completed by July 1.

George Fenn and Lee Brown, Charlotte, Mich., have completed plans for the manufacture of engine parts, and will start up a factory. Mr. Fenn is president of the Fenn Mfg. Company of that city.

H. C. King, of the H. C. King Seed Company, Battle Creek, Mich., has become interested in a farm tractor, and is completing plans for the equipment of a factory in that city for the manufacture of it.

Milwaukee

MILWAUKEE, WIS., April 17, 1916.

The machine tool business is gradually resuming a more normal tone. Large-lot inquiry is absent, but each day brings orders for single tools, making an excellent total sale. Manufacturers are again going after buyers instead of waiting for buyers to come to them, a condition which was due to plants being crowded with business. Extensions of tool works are affording capacities which soon will be able to take care of nearly all available orders. Night and day operations continue. The railroad situation is slowly improving and manufacturers are again able to move products. It has been difficult to deliver machinery to Eastern points, and in many instances tools sorely needed have been standing on track for days. A few small strikes are noted; but on the whole the labor situation is quiet.

The Lutter & Gies Company, 258 Lake Street, Milwaukee, machinery and tool manufacturer, has disposed of its shaping machine business to the Milwaukee Shaper & Transmission Appliance Company, organized recently with a capital stock of $75,000. The new company has leased the former plant of the Stegeman Motor Car Company, 1148-1154 Holton Street, and is installing equipment. The Milwaukee shaper will be manufactured without change of design or name. The Lutter & Gies Company will continue the production of general machinery and tools and do a general machine shop business, with auto parts as a specialty.

The Hardwood Products Company, Appleton, Wis., will build a new factory, 40 x 200 ft., one story and basement. P. Miller, care of Appleton Hay Tool Company, is president and general manager. The architect is A. N. Gmeiner, 818 College Avenue, Appleton.

T. C. Nagler, Osceola, Wis., is having plans prepared for a garage and repair shop, 50 x 120 ft., two stories and basement.

The Kerner Incinerator Company, Milwaukee, has increased its capital stock from $100,000 to $200,000. It manufactures built-in garbage plants for apartments, etc.

The Opsata Plow Company, Eau Claire, Wis., organized six months ago to manufacture farm tractors, has been reorganized under the style of the Eau Claire Mfg. Company. It has completed a factory, 50 x 150 ft., and will start production on or before May 1. The officers are: President, R. B. Gillette; vice-president, J. P. Norrish; secretary, M. S. Op-

sata; treasurer, Charles Keller. Mr. Keller has discontinued his machine shop at Bloomer, Wis., and turned in his equipment to the new company.

The Malleable Iron Range Company, Beaver Dam, Wis., will erect a new shop, 50 x 200 ft., two stories and basement, and an office building, 65 x 100 ft., one story and basement, according to plans prepared by Lockwood, Greene & Co., 38 South Dearborn Street, Chicago. A. G. Hill is president.

The Stevens Lumber Company, Rhinelander, Wis., will double the size of its sawmill and is purchasing wood-working, boiler and power equipment.

The Appleton Garage Company, Appleton, Wis., will add a second story for a repair shop.

The municipal water works commission, Sheboygan, Wis., will take bids shortly for the erection of an addition to the pumping station, 38 x 68 ft. An electric traveling crane will be purchased. William Koehm is superintendent.

The Wisconsin Woodworking Company, Two Rivers, Wis., is preparing to build a new plant on the site of the former plant of the Two Rivers Woodenware Company. The capacity will be approximately 400 carloads of wooden pails annually, or twice the present production. J. F. Conant is president.

A brick and steel garage and repair shop, 70 x 160 ft., one story and basement, will be erected at Downer Avenue and Mineral Spring Road, Milwaukee, by Richard Mohros. Plans are by the Federal Engineering Company, 218 Stephenson Building.

The Badger Wire & Iron Works, Milwaukee, has been incorporated with $40,000 capital stock by A. Haeger, P. Schlesner and Carl B. Rix to take over the business at 687 Muskego Avenue, under the same style.

The Ros-Wel Company, Milwaukee, has been incorporated with a capital of $5,000 by A. G. Rose, Sr., William W. Welch and A. G. Rose, Jr., to do a general engineering and chemical manufacturing business. An office has been established at 112 Miller Building.

The Seaman-Sivyer Company, 251 Lake Street, Milwaukee, manufacturer of lubricants, has increased its capital stock from $10,000 to $25,000.

Cincinnati

CINCINNATI, OHIO, April 17, 1916.

Prices on nearly all kinds of machinery have been advanced to keep pace with the increased cost of production. The exception seems to be small electrical equipment, such as generators, motors and portable electric tools. While the cost of material for constructing these machines has increased within the last 12 months from 20 to 150 per cent and the labor expense is also greater, selling prices are still very close to figures quoted a year ago.

The foreign machine-tool demand is falling off, but domestic business is very good, a number of inquiries recently coming from the Pacific coast. Automobile manufacturers in all parts of the country are very good customers, but the railroads are still holding back and are purchasing only for replacement. Quite a number of second-hand machine tools have appeared lately, among which are a lot of small sized lathes. The 24-in. and 30-in. sizes of lathes, both new and second-hand, are hard to obtain for prompt delivery. Rubber tire manufacturers have lately bought several boring and turning mills.

The local labor situation is unchanged, but in Springfield, Ohio, practically all of the foundries are under a strike, and several have suspended operations. Striking machinists in both Columbus and Urbana, Ohio, are causing some trouble, and in the former place one shop has been closed down temporarily, but expects to resume operations before the end of the week.

The Cincinnati Car Company, Winton Place, Cincinnati, has lately received several car orders and is now operating its plant on full time. No extensions are planned at present.

The French Brothers Bauer Company, Cincinnati, has decided to construct a plant at Plum and Canal streets, for which refrigerating equipment will be required.

The American Diamalt Company, Cincinnati, has let contract for a five-story addition to its plant.

The Walter Kamman Company, Cincinnati, manufacturer of ornamental grill work, has been reorganized and will resume operations at an early date. Some extra equipment will be added.

W. H. Whiteman, Cincinnati, is interested in a company that will fit up a large garage and repair shop.

The Queen City Crushed Stone & Gravel Company, Cincinnati, will establish a sand and gravel plant near Miamisville, Ohio. Part of the necessary equipment has been purchased. James M. Sprague is president.

The Pfau Mfg. Company, Cincinnati, has increased its capital stock from $150,000 to $1,500,000. It manufactures plumbing supplies such as tanks, toilet seats, etc., and contemplates doubling the capacity of its plant in Norwood suburb. It is also reported that a number of outside plants will be consolidated with the company at an early date.

The Kelly & Jones Company, whose main offices are in Pittsburgh and works at Greensburg, Pa., has leased a building at 1008 Sycamore Street, Cincinnati, and will open a branch office and warehouse as soon as stocks can be shipped. It manufactures and deals in valves, steam fittings, wrought pipe, etc. Clifford W. Blaesi, formerly with the Crane Company, is temporary manager.

The Miami Fireproof Door Company, Milford, Ohio, will soon be incorporated to operate a factory for building metal covered doors. C. J. Mees, Fort Thomas, Ky., will be president.

The Lunkenheimer Company, Cincinnati, is pushing work on its new foundry addition. Only a part of the necessary equipment has been purchased.

The Monarch Tag Company, Dayton, Ohio, has commenced work on a new reinforced concrete factory, 65 x 135 ft., three stories.

The Malm Machine Company, Dayton, Ohio, has been incorporated with $30,000 capital stock by J. Frank Kirfaber, Axel Malm, and others. Nothing is yet known as to manufacturing plans.

The Domestic Engineering Company, Dayton, Ohio,, closely affiliated with the Dayton Electric Laboratories Company, has commenced operating its large new plant for the manufacture of household lighting systems.

A. D. Hosterman, Springfield, Ohio, contemplates establishing a hydroelectric plant near Springfield.

The Hocking Valley Railroad Company contemplates building a new roundhouse and power plant at Columbus, Ohio.

The Conard-Hallwood Brick & Tile Company, Columbus, Ohio, has been incorporated with $50,000 capital stock by John A. Conard, Henry S. Hallwood, and others. It will build a plant to manufacture shale brick and hollow tile.

The Minster Machine Company, Minster, Ohio, is building a brick addition to its foundry, 60 x 84 ft., one story.

The Incandescent Light & Supply Company, Ironton, Ohio, has under construction a plant for the manufacture of gas stoves.

Work on the addition to the plant of the Foster Stove Company, Ironton, Ohio, is progressing rapidly. It will be used principally as a pattern storage room.

The Stevens Mfg. Company, Dayton, Ohio, heretofore operated under a partnership arrangement, has been incorporated with $200,000 capital stock by F. Stevens and others. The company manufactures dies, small tools, fixtures and other machine specialties. It will add equipment to double the capacity of its plant.

The C. D. Mfg. Company, Marietta, Ohio, will be incorporated with $100,000 capital stock by Fred. A. Caskey and others to manufacture automobile accessories. Temporary factory operations will be carried on in the plant of the Galvin Mfg. Company.

Cleveland

CLEVELAND, OHIO, April 17, 1916.

The demand for machine tools has quieted down considerably, due to a large extent to delayed deliveries. Most manufacturing plants have in operation every machine that can be put to use and many are in serious need of additional equipment for replacement or extensions, but are getting along the best they can without it. Some are placing orders for shipment at such time as machine tool builders can promise, but others are refraining from buying. The Cleveland Milling Machine Company, which will build a plant for making milling machines and milling cutters, is in the market for considerable machinery and placed some orders during the week. The demand from steel plants for cranes and other equipment is heavy. The supply of labor in metal-working plants is still inadequate. This is especially true of the foundries and some colored labor has been brought into this section from the South.

The National Telephone Supply Company, Cleveland, has awarded a contract for a three-story steel and concrete factory, 80 x 116 ft., to be located at Superior Avenue and East Forty-ninth Street.

The Norwalk Auto Parts Company, Norwalk, Ohio, has been incorporated with a capital stock of $100,000. It plans to purchase the plant of the Sprague Umbrella & Mfg. Company, Norwalk, which will be remodeled for the manufacture of automobile parts.

The Hercules Motor Mfg. Company, Canton, Ohio, has about completed its new plant which will be placed in opera-

tion within the next few days. It will make automobile motors.

The Zahner Motor Sash & Door Company, Canton, Ohio, has completed a one-story addition, 20 x 120 ft., which will be used as a machine shop and for storage purposes.

The Central South

LOUISVILLE, KY., April 17, 1916.

Business conditions continue excellent. With the opening of the building season there is more activity. Preparations are being made by the board of trade of Louisville to work for a fund of $2,000,000. In the ice machinery field the seasonable lull has come. Electrical equipment and electrical tools continue to sell briskly.

The old plant of the Louisville Shovel Company at Floyd and Lee streets, Louisville, Ky., has been leased by the Falls City Machine Tool Company, associated with the Weir Frog Company, Cincinnati, which will manufacture engine lathes. A. G. Schwable and W. T. Long are in charge.

Articles of incorporation have been filed by the Mitchell Rail Anchor Company, 643 North Twenty-ninth Street, Louisville, which proposes to manufacture rail anchors, anti-rail creepers, tie-plates, etc. It has $30,000 capital and incorporators are W. M. Mitchell, W. M. Mitchell, Jr., and H. O. Wieland.

The Cement Floor Tile Company, Franklin Building, Louisville, has increased its capital from $5,000 to $20,000. The capacity of its plant will be increased. S. W. Graves is secretary and treasurer.

Increase in the capital stock of the Freville-Piatt Company from $30,000 to $50,000 and changing of the name to the J. J. Reilly Mfg. Company, maker of steam pumps, etc., have been recorded. A. B. Freville and R. F. Piatt, 1402 West Main Street, are stockholders.

The Hydroplane Construction Company has moved its factory from Point Pleasant, Ky., to Livermore, where it will resume operations.

John T. Gathright, Louisville, and Attorney General James Garnett, Frankfort, Ky., are interested with others in the construction of a railroad from Campbellsville to Columbia, Ky., at a projected cost of $450,000.

Arrangements have been made by the Paducah Hosiery Mills, Paducah, Ky., for a new plant, including a boiler and engine room.

W. B. Hodgkins, Winchester, Ky., is building a machine shop at Irvine, Ky.

The American Metallic Packing Company, Walnut and Clark streets, Lexington, Ky., is in the market for the following items: Fifteen standard gage 40-ton flat cars, one Ingersoll or Sullivan 10 x 10 x 10 steam-driven air compressor, one large iron-working double-head planing machine, all second-hand, and one large universal milling machine.

The Lenox Sawmill Company, Lenox, Ky., is in the market for equipment for a four-mile standard gage railroad, including second-hand flat cars, 30-ton geared locomotive, standard locomotive crane, and is asking prices on a second-hand band sawmill outfit. W. S. Whiting, Elizabethtown, Tenn., is president.

The Durbon Paint Company, Nashville, Tenn., has incorporated with $100,000 and will establish a paint plant. J. R. Richards, C. A. Shoemaker, J. I. Mittenbehler, E. W. Henderson and Charles L. Cornelius are incorporators.

The American Hame & Singletree Company, 618 Sidney Street, Chattanooga, Tenn., will equip a sawmill to provide material for its manufacturing purposes. E. A. Wright is secretary and manager.

The Livingston Light & Power Company, Livingston, Tenn., in connection with a project for establishing a hydro-electric plant on Roaring River, is asking for prices on a waterwheel of about 150 hp., etc. S. O. Kennedy is general manager.

Baltimore

BALTIMORE, MD., April 17, 1916.

City officials of Baltimore, Md., have adopted a bulletin system for municipal purchases. It is in charge of Philip W. Tucker, city purchasing agent. Each day a list of articles for which the city is in the market is posted in the rotunda of the City Hall and in the purchasing agent's office. On Mondays the list contains machinery, metals, hardware and leather and on Wednesdays it contains engineering equipment, electrical and plumbing supplies, sewer pipe, etc.

The Linde Air Products Company, Forty-second Street Building, New York, will construct a one-story plant in Baltimore for the manufacture of oxygen and other air products. The site for the plant will be at Montebello Avenue and Twenty-fifth Street. G. W. Mead is president.

Bids will be received by the board of awards, City Hall, Baltimore, until 11 a. m., April 26, for a pile-driver scow equipped with a 30-hp. boiler and hoisting engine.

The welding and blacksmith shops of the Lawrence Iron & Steel Company, 703 Hillen Street, Baltimore, were damaged by fire on April 15.

New lathes are being installed in the addition to the Thurlow Steel Casting Company, Fourth and Booth streets, Chester, Pa.

A plant for the manufacture of steel railroad ties is being planned for Goshen, Va., by the Nelson-Myer Tie Company, Fort Wayne, Ind. It is understood that the Heins Motor Plow Company, Fort Wayne, is considering the establishment of a plant for the manufacture of farming implements at Goshen.

The Kelly Button Machine Company, Norfolk, Va., has been incorporated with $350,000 capital stock. John Kelly is president.

Birmingham

BIRMINGHAM, ALA., April 17, 1916.

Asked to compare current business in machinery with this time last year, a leading wholesaler said: Our increase over last year in machinery, strictly speaking, is 100 per cent. In wholesale hardware lines the increase is about 50 per cent. Pumps and other equipment for sawmills are probably the leaders, but the demand for hydroelectric apparatus in order to make changes from steam is very active in northern and central Alabama. Machine tools remain as hard to get from the manufacturer as ever. The buying public has manifested no disposition to curtail purchases on account of advancing prices, although dealers are regarding that aspect of the situation with some seriousness.

The Alabama Power Company, Birmingham, has put on file a very large mortgage to the United States Mortgage & Trust Company for 30 years. There will be an immediate issue under this mortgage of several million dollars for building a hydroelectric unit on the Coosa River, an auxiliary steam power plant on the Warrior River, doubling the capacity of the Anniston steam plant, extending transmission lines and taking up certain bonds.

The Albany Handle Company, Albany, Ga., has been incorporated by C. W. Rawson, A. W. Allison, and others, with a capital stock of $15,000, to manufacture shovel handles.

John Rae Gilman, Boston, Mass., representing the bondholders, purchased the properties of the Hilton-Dodge Lumber Company, Savannah, Ga., for $520,000. I. H. Fetty, Kansas City, will be president of a reorganized company.

The American Automobile Company, Americus, Ga., will install machinery.

The Seaboard Air Line, Atlanta, Ga., will expend $100,000 to $150,000 in improving its shops and yards at Howell.

The Southern Sheet Metal Specialty Company, Jacksonville, Fla., has been incorporated with a capital stock of $5,000, and will manufacture metal specialties. Mark G. Ray is president.

Texas

AUSTIN, TEX., April 17, 1916.

The machinery and tool trade is showing a very satisfactory spring activity. Machinery for manufacturing plants is in special demand. Prospects are promising for a big increase of the cotton crop acreage, and it is expected that this will result in the erection of an unusually large number of new cotton gins, cotton compresses and cotton-seed oil mills.

The Seguin Compress Company will build a 12-stand cotton gin at Seguin, to cost $25,000.

The Enterprise Window Glass Company, Tulsa, Okla., having a capital stock of $100,000, will build a plant at Mexia for manufacturing window glass.

The Traylor-Love Company, Sierra Blanca, will build a garage and install a machine shop.

The Ray-Hercules Copper Company is having plans drawn for a concentrating plant which it will build at Ray, Ariz. It will be of 1000 tons daily capacity.

The San Saba Marble Company has been incorporated with a capital stock of $25,000. It will install a marble-cutting plant. C. R. Green is a stockholder.

The Farmers' Gin Company, Gonzales, will build a cotton gin, to cost about $15,000. David Stahl is in charge.

The city commission, Dallas, is considering plans for the building of a municipal electric light plant to cost about $500,000.

The traction franchise which was approved by the people of Dallas at the recent election provides that a minimum of $1,000,000 shall be expended in extensions and improvements to the property within the next 18 months. The light franchise approved at the same time calls for not less than $1,000,000 to be expended in extensions and improvements within the same period.

St. Louis

ST. LOUIS, MO., April 17, 1916.

The request for equipment is still limited by the supply, but there are signs of an easier situation as the earlier pressure is being disposed of. All classes of machinery are now wanted, with practically no second-hand equipment available. Collections are very good, money is easy and investment capital not difficult to obtain.

The Universal Auto Shipping Shoe Company, St. Louis, Mo., has been incorporated with a capital stock of $100,000 by Archibald S. McMillan, W. J. Scott, and others, to manufacture a patented shipping shoe for automobiles.

The M. & N. Auto Equipment Company, St. Louis, Mo., has been incorporated with a capital stock of $15,000 by Eneas L. Noonan, George D. Noonan and William Merten, to manufacture automobile accessories.

The Usona Mfg. Company, St. Louis, Mo., has been incorporated with a capital stock of $15,000 by Isaac Graham, Fred C. G. Long and Herman Branckmann, to manufacture iron, steel, wire, brass and other metal products.

The Semi-Automatic Transmitter Company, St. Louis, Mo., has been incorporated with a capital stock of $15,000 by John H. Mueller, Edward H. Springmeier, Jr., and Charles G. Eck, to manufacture a transmitter.

The Williams Patent Crusher & Pulverizer Company, St. Louis, Mo., has begun the erection of an addition to its factory, three stories, to increase its output.

The grain elevator of the Samuel Hastings Company, Cairo, Ill., which was burned April 8 with a loss of about $125,000, of which $25,000 was on equipment, will be replaced.

The Missouri Pacific Railway Company, St. Louis, Mo., E. A. Hadley, engineer, is preparing plans for a freight station at Joplin, Mo., to cost about $150,000. It will require some mechanical equipment.

The Export Cooperage Company, Leslie, Ark., has been incorporated with a capital stock of $300,000 by W. E. Hemingway, J. V. Walker and B. A. Kobler, and will equip a plant.

J. H. Knudsen, Little Rock, Ark., is reported in the market for oil engines, dynamos and ice and refrigerating equipment for isolated installations.

The Armstrong Steam Separator Company, Hobart, Okla., has been incorporated with $100,000 capital by Cudellas Armstrong, John D. Appleby and O. B. Mothersead and will equip a foundry and machine shop for the manufacture of separators.

The Crown Pipe Line Company, Muskogee, Okla., has been incorporated with a capital stock of $250,000 by J. B. Gregory, A. A. C. Scherbel of Muskogee, and James H. Barr, New York, and will equip a pipe line.

The Picher Lead Company, Joplin, Mo., which has plans for a smelter at Henryetta, Okla., will install equipment for a 4000-retort plant. M. R. Bump, Henryetta, is construction engineer in charge.

The Farrar-Stephens Company, Oklahoma City, Okla., has been incorporated with a capital stock of $15,000 by Frank K. Farrar, A. Leon Chapman and E. N. Crowther to manufacture automobile accessories.

Ardmore, Okla., has plans for the installation of additional pumping machinery at its waterworks plant.

Commerce, Okla., will equip a water pumping station, having sunk a well to provide ample water supply.

Henryetta, Okla., is receiving bids on a pumping set and on a generator set in connection with its plans for waterworks extension. M. A. Berman is city engineer.

The American Machine & Automobile Company, Crowley, La., is in the market for welding and cutting, reaming and boring machinery.

Covington, La., will issue $60,000 bonds to equip a waterworks plant. Xavier A. Kramer, Magnolia, Miss., is engineer in charge.

The Pacific Northwest

SEATTLE, WASH., April 11, 1916.

With the return of favorable weather the machinery market in nearly all lines shows exceptional activity. Inquiries for machine tools are numerous, and while buyers are dissatisfied with prices and deliveries the aggregate of sales is large. Wood-working machinery is especially active, and it is difficult to keep some classes of equipment in stock. Several large manufacturers report record-breaking sales of logging engines and boilers, and marine hoisting engines and accessories are in heavy demand. Orders for smelter equipment include a number of large cranes. Mining projects are numerous and their purchases are an important item. Implement manufacturers are working at full capacity, and orders are coming out freely for flour mill, cannery and refrigeration equipment. Highway and railway construction is active.

The Skinner & Eddy Corporation, Seattle, has received contracts to build two 10,000-ton steel tank steamers for the Standard Oil Company.

C. C. Doud, of the Nickerson-Macfarlane Machine Company, Tacoma, Wash., is organizing a shipbuilding company in that city.

R. E. Ruffschmidt and E. J. Dugan, formerly of Portland, Ore., are preparing to establish a foundry at Bend, Ore., where they have purchased a site and are building a cupola.

The Panama Shingle Company, Olympia, Wash., will build another mill to have a daily capacity of 200,000 shingles.

The Interisland Steam Navigation Company, Honolulu, T. H., has placed a contract for a coaling plant, to cost $100,000, on the Kalihi harbor site, to the Hawaiian Dredging Company.

The Nevada Engineering & Supply Company, Reno, Nev., has been incorporated with a capital stock of $500,000 by C. F. Burton, H. M. Rives and L. A. Gibbons.

The C. I. C. Engine Mfg. Company, Portland, Ore., has been incorporated for $50,000 by Samuel, Jennie and A. L. Pearson and Frederick L. Elder. It is understood a plant will be erected in Portland to manufacture engines.

The Buehner Lumber Company, Portland, Ore., has been incorporated for $750,000 by Phillip Buehner, Henry P. Buehner and Charles H. Carey, to manufacture lumber.

The Butte & Great Falls Mining Company, Great Falls, Mont., has voted to increase its stock from $500,000 to $1,000,000 to develop mining properties recently acquired.

The Koehring Machine Company, Portland, Ore., has moved to 250 East Hawthorne Avenue. It handles a complete line of contractors' equipment as well as Koehring mixers. H. E. Johnson, manager, states business is increasing.

The Gregory Furniture & Mfg. Company, Tacoma, Wash., recently incorporated with $75,000 by Edwin Gregory, H. E. Gregory, G. V. Pinckney, D. I. Sherrill and R. J. McMillan will construct a plant during the summer.

The Pacific Machine Shop & Mfg. Company, Seattle, has been incorporated for $2,500 by Allan Cunningham and G. E. Steiner. It is stated a small machine shop will be established at once.

The Yellowstone Packing Company, Billings, Mont., capitalized for $300,000, plans the construction of a packing plant to include every modern device. J. B. Henderson is president and Dedrick & Piper, architects.

The Du Pont Powder Company plans the erection of a plant for the manufacture of dynamite, gelatin and other explosives at Dawson, Mont. It will expend more than $500,000 in construction and equipment.

The Seattle Port Commission will expend more than $100,000 in improvements and extensions to the shipping terminals. The Spokane Street warehouse will be equipped with refrigerating machinery at a cost of $30,000.

The Bank of Stanwood, Wash., is at the head of a project to erect a sawmill in the vicinity of Stanwood, to have a daily capacity of 100,000 ft.

The Portland Paper Package Company, Portland, Ore., recently incorporated for $50,000, plans the construction of a plant at East Twenty-fifth Street and Holladay Avenue to manufacture shipping cases and corrugated paper. C. D. Bruun, president, states that construction work will begin at once. Joseph Simon and O. W. Mielke are part owners.

A. E. Brais, Riddle, Ore., contemplates the erection of a power plant to develop about 250 hp.

The Aberdeen Shipyards, Aberdeen, Wash., Andrew Peterson, manager, will build a second steamer for the Wilson Brothers Lumber Company. It will be 205 ft. long, with carrying capacity of 1,200,000 ft. of lumber and it is to be completed by Dec. 1.

The Pacific Boiler Company, Seattle, has changed its name to the Pacific Steel & Boiler Company.

Canada

TORONTO, April 17, 1916.

The Bank of Commerce circular states that the Imperial Munitions Board has received additional orders amounting to over $30,000,000 and the volume of orders obtainable appears likely to be maintained.

The Peerless Weaving & Belting Company, Hamilton, Ont., recently incorporated with a capital stock of $150,000, has leased a factory and will immediately equip it for the manufacture of cotton and leather belt, automobile accessories, etc. The company will take over the Canadian rights of the Peerless Belting Company, Gardensville, N. Y.

Springsteen & Co., Blenheim, Ont., will build a new garage to replace one recently destroyed by fire with a loss of $16,000.

The Canada Flour Mills, Chatham, Ont., will install several 200-hp. motors in its power plant.

The Willys-Overland, Limited, 112 Richmond Street West, Toronto, has been incorporated in Saskatchewan with a capital stock of $6,000,000 to manufacture automobiles, motors, etc.

The Alliance Power Company, Edmonton, Alberta, has been incorporated with a capital stock of $250,000 to build power plants and generate light, heat, power, etc.

The Canadian Aloxite Company, Ltd., is making arrangements for the erection of a plant a short distance from Chippewa, Ont., on land owned by the Canadian Niagara Power Company. The plant will represent an investment of between $75,000 and $100,000. Alexander Fraser, Niagara Falls, Ont., and Mr. Chorman, Niagara Falls, N. Y., are promoters of the company. The Canadian Aloxite Company is said to be controlled by the Carborundum Company, Niagara Falls, N. Y.

The Chalmers Motor Company, Detroit, Mich., which recently obtained a Canadian charter with a capital stock of $1,000,000, will establish its Canadian plant at Ford City, Ont. The company closed a deal for the purchase of the plant of the Tate Electric Company and will install machinery at an early date. Clarence A. Pfeffer, Detroit, Mich., is vice-president.

Woodbridge, Ont., will construct a pumping station, etc. Ed. W. Brown is clerk.

Anselme Dube, Three Rivers, Que., is receiving prices and information on wood-working machinery, etc.

The Canadian Hart Wheels Company, Burton Street East, Hamilton, Ont., will commence the erection of an addition to its plant to cost $7,000.

E. C. Gatien, secretary-treasurer of Sherbrooke, Que., is in the market for a power pump of 4,000,000 gal. per 24 hr. capacity at not more than 30 r.p.m. under a head of 250 ft.; a vertical water wheel, flume, shaft, brackets, etc.

The York Knitting Mills will commence at once on the erection of a factory addition at the corner of Queen and Shaw streets, Toronto, Ont., to cost $70,000.

The Corbet Foundry & Machine Company, Ltd., Owen Sound, Ont., is in the market for a 16-in. x 6-ft. heavy-duty screw-cutting engine lathe.

The North Bank Railway Company, Vancouver, B. C., will build a scrap-reclaiming plant at a cost of $20,000. Machinery will be purchased.

The Pollard Mfg. Company, Welland Avenue, Niagara Falls, Ont., will commence work shortly on a foundry to cost $10,000. F. LeBombard is superintendent.

A. D. Swan, 10 Phillips Place, Montreal, engineer of the Anglo-Newfoundland Development Company, St. John's, Newfoundland, is in the market for cranes, transporters, electric conveyors, etc., for harbor equipment.

Ford & Featherstone, 55 King Street West, Hamilton, Ont., agents for the Cary Safe Company, are contemplating the erection of a plant for the manufacture of safes, vaults, doors, etc.

A by-law has been carried at Brampton, Ont., granting concessions to the Acme Rubber Company, which is having plans prepared for the erection of a factory there to manufacture rubber tires, rubber goods, etc., at a cost of $30,000. F. D. Law, 471 Yonge Street, Toronto, is a stockholder in the company.

The Crowley Mfg. Company, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by Thomas W. Pinnell, 567 Concord Avenue; Arthur W. Gilmour, 1106 Dovercourt Road; James F. Coughlin and others to manufacture wood products, furniture, etc.

The M.F.P. Aeroplanes, Ltd., Toronto, has been incorporated with a capital stock of $500,000 by Hamilton J. Stuart, 31 Queen Street West; William Gilchrist, Gertrude E. Hancock and others to manufacture aeroplanes, etc.

The Bournonville Rotary Valve Motor Company, Ltd., Toronto, has been incorporated with a capital stock of $500,000 by William Gilchrist, James Stuart, Hamilton James Stuart, 164 Howard Park Avenue, and others to manufacture mechanical and electrical appliances, machinery, tools, motors, etc.

The Hayes Wheel Company of Canada, Ltd., Toronto, has been incorporated with a capital stock of $200,000 by Reginald H. Parmenter, 85 Bay Street; Arthur J. Thomson, 132 Balmoral Avenue; William S. Morlock and others to manufacture automobiles, motor trucks, etc.

The Canada Boxwood Company, Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 by Franklin M. McDowell, 55 Yonge Street; George R. Sproat, George MacBeth and others to manufacture boxes, paper, pulp, etc.

The Flint Varnish & Color Works Company of Canada, Ltd., Toronto, has been incorporated with a capital stock of $250,000 by William W. Mountain, John J. Carton, both of Flint, Mich.; George W. McLaughlin, George W. Hazelwood, and others of Oshawa, Ont., to manufacture oils, paints, enamels, etc.

The Menard Motor Truck Company, Ltd., Windsor, Ont., has been incorporated with a capital stock of $150,000 by William N. Gatfield, Sandwich, Ont.; Frederick H. Neal, Moses L. Menard and others to manufacture automobiles, trucks, motors, etc.

The Dominion Cutlery Company, Ltd., Montreal, has been incorporated with a capital stock of $100,000 by Michael A. Phelan, Westmount, Que.; Harry A. Ellis, Verdun, Que.; Ayme Lafontaine, Harry L. Coombs and others to manufacture cutlery, tools, etc.

The Mutual Elevator Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of $500,000 by Frederick H. Bole, Fort William, Ont.; John T. Haig, Alexander Adams and others to build flour mills, elevators, etc.

The Canadian Steel Specialty Company, Ltd., Grimsby, Ont., has been incorporated with a capital stock of $100,000 by Harry G. Hess, Jesse J. Foster, Clyde B. Van Dyke and others to manufacture machinery, tools, metals, etc.

The Imperial Motor Company, 150 Albert Street, Ottawa, Ont., will build an addition to its factory. Lewis H. Roy is manager.

The Bay of Fundy Tide Power Company, recently incorporated at Wolfville, N. S., with a capital stock of $50,000, will install a hydroelectric plant at Cape Split, N. S. The initial unit will be 10,000 hp., and provisions will be made for future developments. George B. Cutton, Acadia, N. S., is president.

New pumping machinery is to be installed at the plant of the Water and Light Commission, Barrie, Ont.

The Perfection Tire & Motor Company, Fort Madison, Iowa, has had plans prepared for a Canadian branch plant to be erected at Niagara Falls, Ont., estimated to cost about $300,000.

The Interlake Tissue Mills, Ltd., Merritton, Ont., has awarded contract for erection of an addition to its factory to cost $40,000.

The Canada Wire & Iron Goods Company, Hamilton, Ont., will build an addition to its plant on King William Street.

Government Purchases

WASHINGTON, D. C., April 17, 1916.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, schedule 9525, for one electric welding apparatus for Brooklyn; schedule 9549, for two double-geared steam deck winches for Boston; schedule 9551, for one universal milling machine and one precision bench lathe and schedule 9560, 24 worm-geared train blocks, all for Brooklyn; schedule 9554, for one cutting and welding apparatus for Pearl Harbor, T. H.; schedule 9566, for one 12 x 8-in. motor-driven molder, one 36-in. band saw, and schedule 9567, one 18-in. engine lathe, all for Mare Island.

Sealed proposals will be received at the office of the purchasing agent, Alaskan Commission, Seattle, Wash., up to 2 p. m., April 24, for one driving-wheel lathe, one flue-welding furnace, one flue-welding machine, one heading and forging machine and one set of pipe-bending rolls.

The lighthouse inspector, Tompkinsville, N. Y., will receive bids until 2 p. m., April 25, for furnishing two oil engine and air compressor units to the general lighthouse depot.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, April 11, schedule 9410, construction and repairs, class 73, for Philadelphia, from H. Collier Smith for one motor-driven rotary shear, $2,100.

The Quartermaster of the United States Army Depot, New York, N. Y., will receive sealed proposals until April 21, under schedule 823, for furnishing two marine and gasoline engines.

NEW TRADE PUBLICATIONS

Brass, Iron and Steel Goods.—McNab & Harlin Mfg. Company, 55 John Street, New York City. Catalog, thirteenth edition. Size, 5 x 7 in.; pages, 449. Concerned with a complete line of brass, iron and steel goods for steam, water and gas, including brass, iron body and steel valves; brass fittings; cast-iron, brass and steel standard and extra heavy screwed and flanged fittings; cast-iron drainage fittings and hydraulic valves and fittings. A number of changes have been made in the style of some of the older patterns of valves and fittings and a number of new lines have been added. Changes have been made in practically all of the fittings to adapt them to the increase in the steam pressure that is now used. There is practically no text in the catalog, engravings of the different lines being presented with brief tables giving the sizes in which they are made. A number of tables of useful information are presented and a table of contents and complete alphabetical index are included.

Belt Adjuster.—Cleveland Fabric Belting Company, 1473 West 110th Street, Cleveland, Ohio. Two circulars. Relate to a belt adjusting device which was illustrated in THE IRON AGE, Nov. 25, 1915. This arrangement is made in two types for belts of various widths, the line of division between the two being 12 in. A description of the way in which the adjuster operates with a worm geared drive is presented and there are several views of the adjusters in use for tightening belts ranging from 6 to 36 in. in width.

Motor Trucks.—Federal Motor Truck Company, Detroit, Mich. Volume 3, No. 3 of the Federal Traffic News. Illustrations and descriptive matter explain some of the work that is being done by the trucks of this company in handling a wide variety of material under radically different road and weather conditions. A number of views of the different trucks are presented, together with data on the records that have been made.

Grinding, Polishing and Tapping Machinery.—St. Louis Machine Tool Company, St. Louis, Mo. Catalog No. 15. Points out the advantages of using grinding, polishing and tapping machines having a self-contained countershaft. All of the various machines that can be supplied are illustrated and brief descriptions and condensed specification tables are given. Special emphasis is laid upon the bearings that are used and mention is made of the accessories that can be furnished for the grinding machines, such as the wheel guards and surfacing attachments.

Street Lighting Brackets and Units.—General Electric Company, Schenectady, N. Y. Two pamphlets. The first Y-784 superseding Y-679, points out the advantages of using a line of street lighting brackets and center span fixtures for Mazda lamps. After a general description of the brackets and fixtures, the various designs are illustrated together with the fittings that can be used in connection with them. Wiring and dimension diagrams and curves showing the distribution of light are included. In the second pamphlet, Y-785 superseding Y-681, illustrations and descriptive matter explain the use of Novalux street lighting units for Mazda series lamps. General descriptions of the use of these units and data charts are presented, followed by descriptions with illustrations and light distribution curves of the several types of the units and dimension tables and diagrams.

Saw and Knife Sharpening Machinery.—Wardwell Mfg. Company, 112 Hamilton Avenue, Cleveland, Ohio. Catalog. Illustrates and describes a line of saw and knife sharpening machinery and tools for the care of woodworking and metal cutting saws, knives for planing and jointing machines, etc. The grinding machine for planing and jointing machine knives is a portable motor-driven device which will grind the knives without removing them from their place on the heads of the machine. The descriptions of all of the machines shown are brief, but serve to bring out the salient features. Condensed specification tables are included in a number of instances.

Heat Treating Furnaces.—W. S. Rockwell Company, 50 Church Street, New York City. Bulletin No. 30. Is a discussion of annealing, hardening and tempering furnaces and their operation from the standpoint of automatic handling. After a brief discussion of the influence which uniform heating and uniform temperature have upon the securing of uniformity in the finished product, a number of applications of these principles in actual practice are illustrated and briefly described. The installations covered include a special equipment for the continuous heat treatment of shells, billets and material of a similar nature, the annealing of hollow cylinders and the continuous annealing and hardening of dies. In all of the descriptions and illustrations emphasis is laid upon the automatic features of the equipment and a number of charts showing the uniformity of temperature secured in the heating chamber are reproduced. Mention is made of the various other types of furnaces using oil, gas or coal that can be furnished.

Testing Instruments for Signal Systems.—Roller-Smith Company, 203 Broadway, New York City. Bulletin No. 100. Illustrates and describes briefly a line of electric instruments for signal system testing. These include portable volt-ammeters for use on direct and alternating current circuits and direct reading portable ohmmeters for reading the resistance of the relay contacts used. Tables showing the different ranges of instruments that can be supplied are given and reproductions of scales are included.

Cast-Iron Pipe.—American Cast Iron Pipe Company, Birmingham, Ala. Vol. 1 No. 4 of "Pipe Progress." Devoted to the use of cast-iron pipe for a variety of services. Items of interest to the pipe trade are given, including a review of the market and a table of quotations and freight rates. A table of weights of pipe is given and a scratch pad is a novel feature.

Metal Sawing Machine.—Clarence E. Van Auken Company, 216 North Clinton Street, Chicago, Ill. Circular. Refers to a duplex metal sawing machine, which was illustrated in THE IRON AGE, Dec. 2, 1915. The special feature of the machine is the use of two blades cutting the stock on opposite sides, the advantage of this double-saw arrangement being that one cuts on the down stroke and the other on the up, so that the sawing operation is continuous. Illustrations of the machine and a brief description are presented.

Smelting Furnaces and Equipment.—Allis-Chalmers Mfg. Company, Milwaukee, Wis. Bulletin No. 1417A. Lists a line of furnaces for copper and lead smelting and the equipment used in connection with them. After a brief introduction dealing with the smelting process, illustrations and descriptions of a number of different types of furnaces are presented. Illustrations of some actual installations are also given. The accessories covered include barrows, cars, charging scales, etc.

Engine Lathes.—Lodge & Shipley Machine Tool Company, Cincinnati, Ohio. Bulletin No. 140. Pertains to a line of engine lathes and the attachments used with them. Brief descriptions of the different parts of the lathe, instructions for operating, suggestions for handling work and grinding tools, etc., are given, the text being supplemented by a number of engravings of the several parts of the lathe and one of a complete machine with the various parts marked.

Oil Engines.—Nordberg Mfg. Company, Milwaukee, Wis. Bulletin No. 27A. Calls attention to high-compression two-cycle oil engine which is built in three sizes, ranging from 50 to 200 hp. The special features of the engine are the elimination of ignition devices, a multi-stage compressor for the injecting fuel, and gears or valves subject to working pressure and heat, a single piston valve on the cold end that controls the scavenging air being the only valve on the engine. A number of photographs and detail sectional drawings of the engine are presented, together with reproductions of power and scavenging cards.

Jolt Ramming Machine.—Vulcan Engineering Sales Company, 2059 Elston Avenue, Chicago, Ill. Circular. Calls attention to an electro-pneumatic jolt ramming machine in which air in a compression chamber in the base is used to raise the plunger and table which afterward is dropped by the exhaust. The machine is driven by an electric motor with a double silent chain drive to the piston. An engraving of the machine and a sectional elevation showing its construction, which is without a clutch, spring, cam or valve, are presented.

Pumps.—Deming Company, Salem, Ohio. Catalog No. 25. Relates to a line of pumps which are made in a number of different styles for a variety of uses. The catalog is divided into sections each of which embraces the pumps or other articles that are related to each other in their most essential points. The pumps covered include house and windmill lift and force, miscellaneous hand and power, centrifugal and rotary, single and double acting, triplex power, horizontal double-acting power and spray pumps; deep well working heads and hydro-pneumatic systems, together with the various accessories and supplies for the classes. As a general rule each particular pump has a single page devoted to it with an engraving, brief description and table of the various sizes in which it can be supplied. A consecutive figure number index and an alphabetical index are included, together with a telegraph code and a number of tables of useful information.

Wire Machinery.—Bates Machine Company, Joliet, Ill. Catalog. Contains illustrations and brief descriptions of a line of wire machinery, the descriptive matter being presented on one page with the engraving on the facing one. The machines listed include barbing, twisting, drawing, pointing and baking machines; annealing and muffle furnaces, galvanizing reels and wipers, a galvanizing frame and a wire staple machine.

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